



NEWS IN BRIEF

Fun day at BCS 79

A SATURDAY of fun and education for children is a feature of a three-day conference to be held by the specialist groups of the British Computer Society in London from January 4 to 6.

Called BCS 79, Living with Computing, the event will include 18 presentations from BCS groups including computer arts, programming, languages, medical applications and word processing. Three-day tickets cost £25 for BCS members and £50 for non-members, with reductions if booked before August 31.

Saturday-only tickets are at a bargain £1 for adults and 50p for children. For further information contact BCS 79 conference office, BCS, 29 Portland Place, London, W1N 4HU.

Future of telecoms

THE future of Post Office Telecommunications is to be the subject of the first event from Information Systems of Chorley Wood, Herts, a new conference-organising company formed last month by Al Dunn, Neil James and Roger Barnes, who previously worked for Online Conferences. The Post Office conference will be held in London on September 25 and 26.

DEC disc range

THREE new disc drives introduced by Digital Equipment range in price from £2,500 to £15,100. The smallest is the R101, a 5.2 Mbyte system for PDP-11/04 to VAX-11/780 systems there is the 28 Mbyte RK07, and for the top end PDP-11/70 and VAX-11/780, there is the 67 Mbyte RM02.

College picks 2903

THE Lincoln College of Technology is to install a £34,000 ICL 2903 computer system this month. It will be used for batch processing and interactive program development on eight terminals by 6,000 students from the college and local schools.

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COMPUTER WEEKLY

Samet hits at bizarre financing

SHORTAGE of accommodation is presenting a major difficulty to University College, London, over its installation of a new computer system, according to Professor Paul Samet, director of the computer centre, who places the blame on the "bizarre" way university computing is financed. The college has received approval to buy a system of GEC minicomputers (CW, September 1, 1977) to replace its ageing IBM 360/65, but has nowhere to put the new hardware during a changeover period.

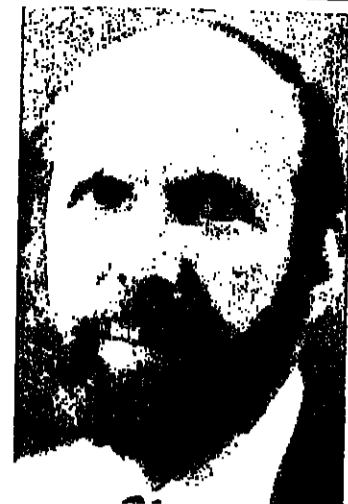
The difficulty, according to Samet, is that although the

computer hardware is paid for by the Computer Board, accommodation has to be provided by the University Grants Committee, which will not even approve the planning of new accommodation until the equipment purchase has been passed by the Computer Board.

The UGC has still not taken steps to provide space for the GEC machines, which were ordered some months ago, says Samet. If the college has to provide accommodation this will involve additional expense, and the withdrawal from service of the 360 will be greatly delayed.

Samet complains that the Computer Board has a stated intention of replacing machines on a 10 year cycle, but did not even approve the initiation of a replacement programme until UCL's machine had been running for over 10 years.

The college is talking to Cambridge and Newcastle Universities, to arrange for them to join Metronet, the network that links all the London University computers. This would provide access to an IBM service for UCL users after the 360/65 is removed. The other two universities are in favour of this.



Paul Samet - no planning allowed to accommodate mini system.

NCR men vote on strike

FOLLOWING a breakdown talks between NCR and its last month over new job offers and salary scales, field engineers, the negotiating team has recommended that the men go on strike.

The engineers will vote on recommendation and if they agree, initial action is to take the form of a 24-hour strike, followed, if necessary, by lock-outs in key areas.

Teaching system

A NEW operating system educational purposes was developed by ICL and NCR for the University of

Called Minimax, it is a simultaneous batch and online access from terminals. A powerful data entry control system from the terminal is not

program and all the programming languages are available to the terminal. The basic 2903 Educational is with Minimax and costs about £40,000.

UNDER a four-year contract worth \$7 million, Honeywell Information Systems will provide Level 68/20 computers as well as maintenance, support and operating staff to the US Army Corps of Engineers.

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PFC (Continental France Ltd)

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Briefing IBM goes into Orbit

BY the end of the year, IBM is expected to announce two major new products, the Orbit distributed processing 32-bit mini, and the small to medium replacements for the 370, the E-series.

Orbit is designed as a 3790 replacement for distributed processing applications and will be as powerful as a Digital Equipment PDP-11/70. The E-series, which was originally scheduled for announcement earlier this year (CW, March 30), is now expected in the fourth quarter of 1978.

Ventek debut

COMMON hardware and software modules, including existing Datapoint systems, are the basis of Ventek's new distributed processing architecture, described by the company as Attached Resource Computer systems.

First 16K Prom

WHAT is believed to be the first 16K PROM in the world to go into production has been announced by Signetics. It is available in sample quantities now and will be available in volume by next year. Technical features include a typical access time of 80 nanoseconds and a maximum power dissipation of 925 milliwatts.

Software contract

AN online commodities trading system is to be developed by Software Architects under a £80,000 contract from Perkins Elmer Data Systems. The system, for London metal merchants Brandeis Goldschmidt, will run on an Interdata 7/32 with 256K of memory, using Cobol and the Itrac transaction processing monitor.

UCSL choice

MACHINES from Intel and AMD's as well as IBM are being considered by Unilever Computer Services Ltd as replacements for two 360/65 systems at its Watford centre. A decision is expected in the next few months. UCSL already has an Intel AS/6 at its Burgess Hill centre.

Euro distributor

A EUROPEAN distributor for the IBM compatible M80 computers built in the US by Magnus Systems (CW, June 1), is expected to be announced within the next few weeks. It will be a well-established company in the computer business that already operates in most of Europe, according to Magnus.

World finals

OFFICIAL sponsor of the US badminton team which competed for the Uber Cup, badminton's equivalent of the Davis Cup in tennis, ICL contributed about £8,000 towards the expenses of the non-professional players in the world finals in Auckland, New Zealand.

COMPUTER WEEKLY

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Price 18p



Four of the judges of Computerstyle 2000. They are (left to right): Computer Weekly editor Malcolm Peltu, director of the National Computing Centre David Finberg, the technology correspondent of The Guardian Peter Large, and Datasilk managing director Tim Holley. The fifth judge, William Woolford, of BBC's Tomorrow's World, was filming in Germany during this judging session.

IPC buys Systems International

THE monthly journal, Systems International, has been purchased by IPC Business Press, publishers of Computer Weekly, for a total sum of about £450,000.

The present editor and sales manager of Systems, Frank Booty and Guy Pearce respectively, will continue in the current functions and the first issue of Systems International under IPC Business Press control will be this month's issue.

Publishing director of Systems International will be Christopher Hipwell. IPC Business Press has bought the entire issued share capital of the previous publishers of Systems, Genshire Ltd, for £400,000 plus a sum equal to the net asset value of the company, which is expected to be about £50,000.

Peter Yapp, managing director of Electrical-Electronic Press division of IPC Business Press, which will have responsibility for Systems International, said that the newly acquired publication "is a healthy and welcome addition to our company, strengthening our already well-established position in this market. It is fitting to vary well alongside our other journals such as Computer Weekly, Computer Products International, Electronics Weekly, Electron, and Data Processing.

Slick tracking of oil at sea

SOFTWARE for predicting the spread of oil at sea has been acquired by BP's bureau subsidiary Sclerol. The system, Sclerol, will be used to provide two types of service: forecasting the spread of oil from an accident; and pinpointing when and where oil was dumped.

COMPUTER WEEKLY'S INSIDE NEWS

There may not be many of them, but the women in the UK computer industry have made their mark. Christine Harvey takes a look at some of the success stories (pages 22/23).	10
The continuing shortage of skilled and experienced computer staff could result in a "pay revolution" once recruitment is removed. A survey by BIS Applied Systems analyses the rewards of top DP people and the fringe benefits that ease their lot (page 34).	11
Personal computing has come to the aid of a disabled ex-serviceman who has been paralysed for 19 years. It has opened new horizons to him and he may even be able to get a job again (page 12).	12
puting has developed since he was last there four years ago. The computer population is still sparse and there is tight government control, but he considers the prospects to be bright (page 20).	13
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Computerstyle 2000 top prizes shared

TOP prizes in the Datasilk/Computer Weekly competition, Computerstyle 2000, have been shared by Bryn Jones of Haverfordwest, Pembrokeshire, and consultant David Butler, of Butler, Cox and Partners.

Each will receive £150 as a share of the first two awards, which had originally been specified as £200 for the first prize and £100 for the runner-up. The third prize of £75 was won by John Garrett of CSI. Computer Weekly is also making special awards of £25 each to three entries which had particular originality, although the judges decided they did not come in the first three.

The special awards go to John Finnie of GKN Group Management Services in Solihull, Paul Holden of Applied Management Systems in Dublin, and A. Thornton of British Rail in Derby.

All the award winners will be published in Computer Weekly, starting this week with the winners of the first prize.

Butler found it difficult to choose between the two winners because their essays were in a "look back" in a history book... in the year 2000, and Jones in story form.

The judges felt that, on the whole, the entries were competent rather than brilliant, with many interesting ideas but few that were unexpected. The picture built up of lifestyles in 20 years' time were mainly along the lines that have been covered over the past year in Computer Weekly, with a generally optimistic view that the dangers of a neo-Luddite backlash against information technology will be overcome.

The competition asked for essays on the likely impact on home and work styles that computers might have by the year 2000.

● Turn to page 3

Council orders first new model in 2900 range

A MEDIUM to large scale addition to the 2900 range is due to be announced by ICL this week and Oxfordshire County Council looks like being the first customer.

Oxfordshire has 1804S at the moment but a spokesman told Computer Weekly that a much more powerful system was needed to meet the authority's future data processing needs.

The spokesman was unable to give any details of the system that ICL has lined up for Oxfordshire, but suggested that it would be in the 2970 performance area.

The new system could be constructed using the technique that ICL calls cross coupling. This involves taking components from different existing machines to create a new model.

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July 1912

Ready, willing and able....

HERE, in quaint Old England, we tend to think that everything in the US is too trendy and progressive to be true. In reality, many old-fashioned things prevail, not least the deep "Old Testament" type religious feeling.

This is why the Logical Machine Corp, Lomac, the firm that makes the "no software" system called Adam, is thinking twice about calling a bigger version of Adam currently on the stocks by the name they favour — Abel — Son of Adam, of course. This, despite the fact that the equally Biblical name Adam has been accepted with no fuss in the US.

Lomac is seriously considering changing round the last two letters so that the name sounds the same, but comes out as Able.

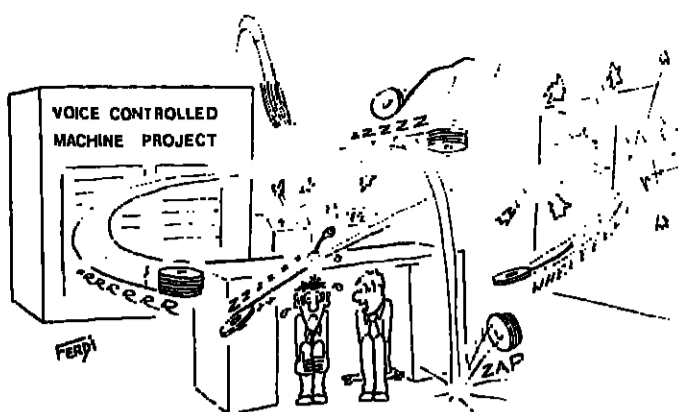
Problem is that Able is difficult for people in France and Germany, two of Lomac's biggest overseas markets, to pronounce, so the firm may compromise and call Abel Able in the US and Abel Able in Europe.

I do hope you are able to understand all this.

Technology under the hammer

AS THE Renoirs and Picassos disappear into the world's art galleries and private collections, the auction business is turning more and more to technology, or at least the early attempts at it — and is finding a surprisingly ready market.

Last week, Christies were entrusted with the task of



"We must assume it knows the meaning of the name you called it."

selling an old German Columbia typewriter. Its owner thought it was worth £20. Christies' experts estimated a sale price of between £200 and £300. The eventual sale price was £750.

And this was for a machine patented in 1885, with the simplest type of type-wheel, yet with the sophistication of

proportional spacing. It makes me wonder what the current crop of word processing machines might fetch at Christies in 80 years' time. I recently saw a classic in office equipment, an IBM Executive electric typewriter, knocked down at a Hitchin auction for £8.

Well, it's a start.

DOWNTIME

by Chad

What's in a name?

ONE of the less pleasing aspects of the computer business is the way numbers are used by and large instead of names.

Logica's new word processor (CW, June 1) was known throughout its development as Rivet (Remote Input Video Editing Terminal), but this turned out to be a rude word in Spanish, so the machine is now called VTS/100.

This problem of names having unwanted meanings in foreign languages is why many international companies give their products numbers only. The talk at Xerox's R&D centres is pep-

pered with many colourful code-names, which are sadly dropped as soon as the machine goes on the market: Orlando, Agate, Decoy, Carol. The new giant copier was known for years as Ardri but is now, officially, the 9200.

We at CW are particularly sorry about the dropping of "Rivet," because Logica has hopes of selling some of these machines to the British Steel Corporation, one of their existing customers — and we could then have had a headline along the lines of "British Steel buys Rivet."

PETER HEWITT REPORTS ON THE FOURTH NATIONAL CONFERENCE OF THE NORTH AMERICAN DATAMANAGER USER GROUP

Users stress need for data management standards



Although the great majority of Datamanager users is based in North America, head of MSP David Gomes da Costa (pictured left) stated in response to a user's question that there is at the moment no intention to move the software development team from the UK to the US. Describing the long lead-time between initial

evaluation and eventual installation of the product, he predicted that current interest in Datamanager would lead to an approximate doubling of the user base over the next year. If the company's anticipations were confirmed, North American users would then number about 250, with about 80 users in Europe.

"DATAMANAGER is an excellent tool with which to implement installation standards, but you must devise standards first which could be implemented manually." Such was a typical view expressed at the fourth

national conference of the North American Datamanager User Group, held in Boston from May 17 to 19.

The meeting attracted about 100 users of MSP's data dictionary system, representing

some 73 installations out of a total of 123 which have installed the product in North America.

Those attending had widely varying experience of the system, ranging from a few weeks to nearly three years. As a result,

some were interested in developing advanced active uses for the dictionary while many were chiefly concerned to pick up tips on getting started.

In its most basic role, Datamanager acts as a repository for system documentation, holding, correlating, and disseminating information on fundamental system entities: systems, programs, files, groups, data items, and the relationships between them.

Even in this passive role, data dictionary systems are in a state of relative infancy and many users clearly feel that they are venturing into uncharted waters. The conference was for them a valuable opportunity to benefit from others' experience.

One immediate task for those installing a data dictionary is to decide on systematic naming conventions. Datamanager users worldwide have accumulated much valuable experience in this area, which was often returned to in open discussion periods.

One of the most colourful of the formal presentations also addressed this topic. Russ Stefany, of American Cyanamid, described his company's approach to the development of standard word abbreviations, for use as building blocks in the creation of entity names.

The work had involved constructing a software tool which would generate abbreviations. Cyanamid's standard had dictated a maximum size of six characters, and one important aspect had been the elimination of synonyms.

The complete PR vocabulary which emerged from this project contained only 639 standard terms, including such forms as NU for number, PROD for product, and PCRG for package. The general rule had been to drop vowels, but for certain very common words, such as number of product, popular abbreviations were substituted.

Other topics of concern among those just starting were procedures to control updating of the dictionary and whether or not to document existing sys-

tems retrospectively.

On the latter question, some felt that the effort required, admittedly massive, usually resulted in a dictionary of established items which would recur in new applications.

Others, pointing to the limited five-10 years life of most DP systems, felt that it was not worth taking on old data. These users preferred to use the dictionary only on new systems.

A compromise favoured by some was to restrict retrospective documentation to the level of systems, programs, and files — ignoring the details of individual data elements and groups.

Datamanager provides an automatic set-up facility, which creates a dictionary automatically from program source code; this feature can be used to load the dictionary with documentation on existing systems.

However it was pointed out that, with poorly-controlled naming standards in existing programs, the resulting dictionary is of little use. Many identical members would generally occur under different names, and identically-named members could actually refer to distinct entities. Thus automatic set-up does not avoid the need for basic research.

Some of the most interesting possibilities for data dictionary use are in active mode. Here, the information in the dictionary is used to drive application systems.

Many users, for example, already use the dictionary definitions to generate data structure source code for insertion in programs. At the moment, the dictionary is used mainly to load an intermediate copy library. Future developments may enable compilers to access the dictionary directly, generating and inserting appropriate source code at the time of compilation.

One large-scale Datamanager user, the Xerox Corporation, has written a Cobol pre-compiler designed around the recently released Access/Call feature. By accessing information in the

dictionary, this software is able to generate the first three divisions of a Cobol program automatically.

The pre-compiler is also used to enforce the Cobol programming standards adopted by Xerox, which ban certain language constructs, and to format Procedure Division code in a standard way.

Another user, Charles Rauch, of Sperry and Hutchinson, described an interface built between Datamanager and the ASI-ST report writer.

The interface enabled Datamanager to build the internal dictionary used by ASI-ST, thus eliminating potential data redundancies and inconsistencies in the installation.

Sperry and Hutchinson also use Total and use the source code language generation facility of Datamanager to produce both Total DBGEN data and Cobol copy library source. In this way, the dictionary, acting as the primary inventory of system data, also controls and synchronises the global use of data.

Also discussed were more futuristic applications of the dictionary. These would further extend the control exercised over user programs.

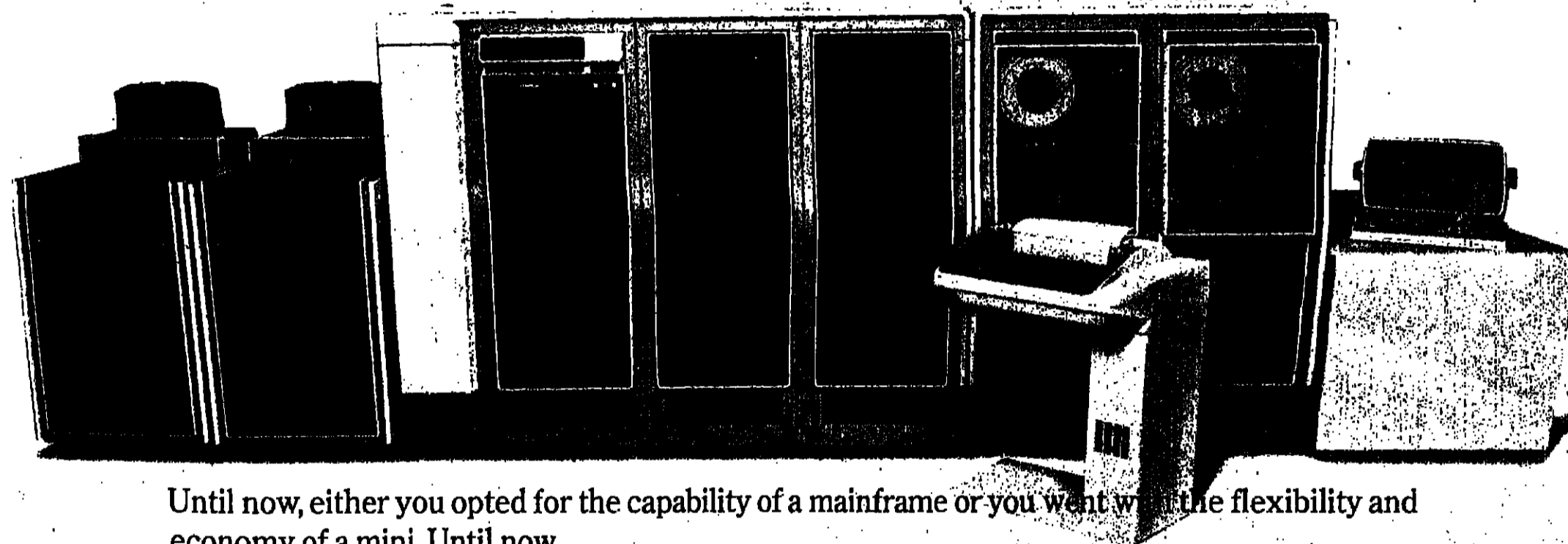
One possibility is to build a generalised editing facility. As Datamanager holds the complete specification of valid data, such as type, range, and values, the system could be used for centralised edit control.

Another possible development mentioned was a facility for test data generation. Using the data item database, the dictionary could be used to create comprehensive test data files automatically.

The variation in uses and potential uses so far found for Datamanager poses problems for MSP in deciding on the course of development, both in the area of new intrinsic functions and in the area of interfaces with other software.

A change to the user procedure to allow the users to determine the future development direction has been instituted.

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SCS

MICHIE'S PRIVATEVIEW

The six-legged robot leaves a senator standing



Professor Donald Michie, of the machine intelligence unit at Edinburgh University, writes from Cleveland, Ohio, where he was lecturing at Case Western Reserve University . . .

IN THIS rolling State of Ohio a local dust-storm has involved an obscure robot and a famous politician, leaving the robot on its six legs, but Democratic Senator William Proxmire from Wisconsin standing inelegantly on one.

The Senator specialises in withering assaults on federally financed university projects. On this occasion he ripped into Robert McGhee, Ohio State University's professor of electrical engineering, whose development of a six-legged walking robot is funded in part by a \$400,000 grant from the US National Research Foundation. In the hilarious style which has brought blight to many other ventures, Proxmire suggested that the "Bionic Bug" would be of more use as an adjunct to the university's football team.

McGhee had instant ammunition. He pointed out that the Veterans Administration is already launching tests of an artificial knee-joint for humans, developed from his technology, and that NASA had expressed interest in connection with the Mars Rover project familiar to readers of this column. Far from showing familiarity with such matters the Senator had not even sought McGhee's own comments before releasing his outburst. Now the chief official of Proxmire's committee has taken the blame and admitted that his staff should have checked.

In the context of our own country's repeated failures on the science/politics interface, this little American comedy grazes close to tragedy. The US is rich enough to be able to afford the costs and frustrations entailed by such knock-about. Britain is not.

Ironically, I remember a

meeting just 10 years ago with Ivan Sutherland, whose well-deserved election to the American Academy of Sciences has just been announced. He asked me whether any academic laboratories in Britain would be interested in bidding for a contract to investigate automated walking. He was then on secondment to the US Defence Department and in charge of its Advanced Research Projects Agency's R&D spending on information processing.

So much importance was seen in such a development, that if no credible domestic bids were forthcoming, his agency was prepared to consider the unusual step of subsidising work by foreign nationals.

It should be obvious on reflection why this might be so. A quick survey of the world's land masses prompts the question: "What proportion of the total terrain is negotiable by jeep or tractor? What proportion is negotiable by horse, mule, camel, llama or elephant?" Many people view automobile technology as having reached a plateau, with nothing but snail optimisations here and there to be expected.

Nothing could be more profoundly wrong. It only looks that way because until supporting technologies for a new leap forward have been developed no-one can ever envisage the leap. Wheeled transport did not require the micro-processor revolution as a precondition. But legged transport does.

There is an interesting precedent. Readers may have seen artists' reconstructions of primitive birds in books of evolution. I remember from my childhood one called Archeopteryx with a majestic flowing tail. A contemporary observer (who would have had to be an extraterrestrial, since our own ancestors were not then up to ratio-cinations of this kind) might have concluded that this wonderful flying frame had been highly optimised.

So it had, on the criterion of aero-dynamic stability. But the remarkable further evolution of the bird's brain introduced the completely new principle of feed-back stability. A stuffed Archeopteryx could have been used as a glider. When its brain is engaged, the seagull's ability to glide is unsurpassed. Aero-dynamic stability has been sacrificed in nature's designs of modern birds, with a previously unthinkable gain in manoeuvrability.

Such lessons have all been drawn and pondered long ago (Privateview, August 18, 1977) by AI workers at the USSR Academy of Science's Institute of Applied Mathematics and Information Transmission, in collaboration with Moscow State University. They now have an impressive variety of six-legged robot designs under test. This too, I am glad to report, was brought by McGhee to the attention of Proxmire's Senate Committee.

Saddest of all, however, is that the successful rebuff to ignorant persecution was achieved by arguments which McGhee regards, as I do, as being entirely beside the main point. The quick-fire rejoinders happened to be ready to hand and they did the job.

McGhee's initial utterance, before his university's public relations office came to his aid, was: "Basic research is for producing knowledge, not new products." I agree with him.

PROGRAMMER NOTES

Why some programs are falling short on quality

DESPITE its shortcomings, Cobol offers good facilities for writing clearly structured and readily intelligible programs. Why is it then that so many programs fall far short of this standard?

Programmer Notes some weeks ago discussed a set of programming conventions for "Sensible Cobol", which were presented at the Online Conference, "Pragmatic Programming and Sensible Software" (Programmer Notes, March 30).

It seemed surprising that the conventions identified, including, for example, the use of meaningful names, should still need such reiteration. However, as was noted at the time, it is undeniable that much programming is read and maintained only with great difficulty by anyone other than the original author.

The speaker at the Online conference, Arne Rohde of Bang and Olufsen, made no claim that his suggestions were original. He has now gone on to describe some of the factors which in his opinion contribute to their less-than-universal acceptance.

Rohde lists six principal causes:

- Poor quality is in many cases due to the programming manager's lack of appreciation of the importance of programming style. It can be difficult to justify the use of extra programming time — which may be required to write a

good program — in terms of a possible time saving when the program has in the future to be modified.

The short-term saving is often given priority over the potential long-term saving. Even if lip-service is paid to program quality, it is not unusual to see other factors assigned a higher priority when a program is behind schedule and has to be finished by a certain time.

● Some programmers feel that standards somehow restrict their creativity, and that further programs could be written if there were no standards.

This may be the case if programming is regarded entirely as a coding activity, but not if programming also embraces the program design phase. The aversion to standards would probably also be less if their definition were a more democratic process, with all programmers participating in the activity.

● Some programmers consider that program "efficiency" is incompatible with program legibility and structure. A good example of this appeared in Programmer Notes a few years ago (CW, December 4, 1975), where the ALTER verb was defended as an efficient first-time fix.

I sometimes wonder if the writer who defended the ALTER ever tried using the more efficient alternative given subsequently (Programmer Notes, January 15, 1976), and if the difference was measurable.

The efficiency which many programmers consider so vital is totally unimportant in comparison with the efficiency well-chosen algorithms.

● There is no general agreement among programmers as to what constitutes good programming style.

It would surprise me if there were general agreement even on the 20 points listed previously. Some of them differ from those given by Chumura and Ledgard in their excellent book on programming style, although most of the differences are minor.

● Despite the efforts of Weinberg and others, many programmers seldom read programs written by others. Hence they fail to appreciate the importance of legible programs which are easy for other programmers to modify. It is easier to criticise programs which are not written by yourself.

● There is a lack of literature on Cobol programming style. Recently a number of books have addressed the problem, but there are very few, if any, which are more than three years old. Rohde concludes: "Perhaps it is not so surprising after all that standard techniques for writing clear and intelligible programs have not been generally accepted."

*Cobol with Style: Programming Proverbs, by Chumura and Ledgard, published by Haylen, 1976.

High standards of Advanced course students

TODAY's programmer may have acquired the tricks of the art by conventional training or perhaps during hands-on sessions.

But tomorrow's programmer could well have acquired skills through Ordinary or Advanced Level General Certificate of Education computer science courses.

A review of the syllabus for the Advanced courses of any of the education boards could well cause established programmers to blush at their own lack of

knowledge. Programmer Notes saw how one course is run.

While some schools are running the courses, various Colleges of Technology are also offering "A" level studies together with a variety of both vocational and non-vocational computer studies.

The North East Surrey College of Technology at Ewell, instructs candidates for the University of London certificate. Ivor Hughes, course lecturer, said that the London Board was chosen for its emphasis on programming rather than the use of computers within industry and commerce.

One surprising side of the computing science studies is the inclusion of a project in the course. Students are expected to devote roughly half their course time to its production. The completed project is then graded by the college itself and submitted to the examining body for review. Students may be interviewed by the examiners about their projects.

The scope of the projects is essentially of the student's own choosing, but necessarily has to be self-contained. Games are an obvious choice but students can choose a project involving no actual programming; for example a feasibility study on a local company's payroll. Standards are amazingly high and could easily put commercial concerns to shame.

Programs are documented to the highest standards which are taught throughout the course. Average program size for a project would be of the order of 300-500 Basic statements. Hughes teaches a modular program construct which he says helps students to understand the problem as a whole and reduce it to component parts.

Probably the most difficult

SOFTWARE FILE

Lloyd's develops the Lots system for use on PDP-11s

MAJOR transaction processing software has been developed by Lloyd's of London for use on Digital Equipment PDP-11 computers. Running under the RSX-11M operating system on a PDP-11/70, the software is currently supporting just under 100 user terminals.

The system, Lots (Lloyd's Operational and Telecommunications System), is said to be suitable for the PDP-11/45 upwards and to require a minimum memory of 150K. It supports application programs written in Coral-66 or Macro-11.

Itself written in Macro, Lots is fully multi-threading and provides comprehensive filing services and task management facilities. It also includes software to support teleprocessing from local or remote binary synchronous terminals.

In operation, Lots is applications and data independent, using the standard RSX-11M executive to handle such func-

tions as physical data transfers.

Multiple applications can be processed simultaneously by the software, which, on the PDP-11/70, is capable of servicing up to five message pairs per second. Lloyd's points out that up to 1,000 Megabytes of online files can be supported, by making a suitable choice from among the

six disc access methods available.

Lloyd's Management Services group, began work on the TP monitor about two years ago, in conjunction with a major software house. There was at that time no suitable software available for TP applications on the PDP-11, although DEC has

since released its own system, TPM/70 (CW, January 5).

Lloyd's is using Lots as the basis of a major insurance application. When fully implemented, the system will enable the Policy Signing Office to record about a million items of insurance business per year, from about 150 terminals.

This information is used for the settling of accounts between Lloyd's underwriters and brokers, and for the signing of Lloyd's insurance policies on behalf of underwriters.

Representing a major development effort, the Lots software could well be of interest to other DEC users. Although Lloyd's has no explicit marketing plans, a spokesman said the group would naturally be pleased to recover, via sales, some of the large investment made in the development.

EDITED BY PETER HEWITT

Secure package being marketed by new company

MORE information has now become available on Secure, a new data access security system for IBM OS users. The package, from Boole and Babbage, is being marketed by a newly formed software products firm, The European Software Company (CW, May 18).

Secure provides protection for both disc and tape data sets, controlling access both from batch jobs and TSO terminals. The system monitors access to system software and application program libraries as well as to data files, providing a consolidated report of authorised and attempted violations.

Transparent to the user, Secure's access control mechanism requires that jobs must be specifically authorised to update data sets.

Authority may be restricted

for example to read-only access; a fixed maximum number of accesses; certain time periods during the day; specific job, user, account, or program names; or to only batch jobs or TSO foreground jobs.

Based on an access control data set, the software allows for progressive implementation, as more files are added to the body of secured data. The software can also be used to protect multiple-CPU installations via a single disc-resident access control data set, thus allowing sharing of protected volumes between processors.

Secure operates under MVT, MPT, OS/VS1, SVS, and MVS. The European Software Company, which is in the process of opening a UK office, is represented in Holland at Hofzichtlaan 20, The Hague.

Compeda establishes American subsidiary

ENLARGING on their intentions announced earlier this year (CW, March 16), Compeda has established a subsidiary in the US, with offices in New Jersey and San Francisco, and is to form a company in Holland.

Itself a subsidiary of the government's National Research Development Corporation, Compeda was set up to market world-wide software developed in the UK for high technology applications. A major part of its task is to realise the full potential, both technical and commercial, of systems developed within universities and other state-aided institutions.

Both new companies will market the full range of Compeda products, but the Dutch operation is likely to concentrate on selling its Pipework Design Management System (PDMS) to the European petrochemical industry.

In North America, the organisation's first step has been to arrange a series of seminars and demonstrations in Montreal, Houston and San Francisco. Compeda Inc will also be exhibiting at the NCC and at the International Petrochemical and Process Exhibition in Philadelphia.

In addition to PDMS, the Compeda inventory includes Guelic, a computer-aided design system for integrated circuits and printed circuits, which was in part developed at Edinburgh

Meeting of joint user groups

USERS of the industry's most widely installed non-IBM program product in the UK — ADR's Librarian, with over 4,500 sites — are for the first time holding a joint user group meeting with Roscoe users. The meeting, organised by CAP-CPP is on June 8 and 9, at the Excelsior Hotel, Heathrow.

Digest updated

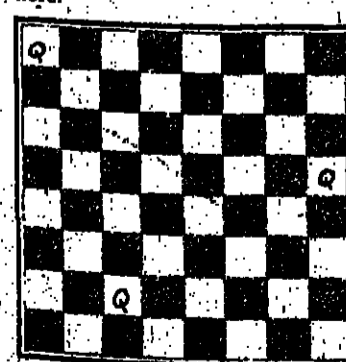
THE CICS/VS quick reference digest published by On-Line Software International of New Jersey (CW, March 2) has been updated in format, content, and price. The chief changes are a new plastic spiral binding, extended and updated technical content, and a doubling in price to \$10.

UK agency for Stop

THE on-line test aid for IBM CICS based teleprocessing systems, Stop, has now found a UK maintenance agency (CW, April 27).

Puzzler

MOST people know that five Queens are needed to "cover" all 64 squares of a chessboard, so that each square is either occupied or attacked. One way of placing the pieces is shown here.



What is not generally realised is that three Queens, Rook and Bishop can do the same job if placed in optimum positions. Can you work out this configuration before turning to page 81 for the solution?

RTL/2 for DG Novas

AN RTL/2 compiler is to be implemented by Software Sciences for the Data General Nova range of minicomputers. Development and marketing is being backed by the National Computing Centre under the Software Products Scheme and the compiler is scheduled for release in mid-1979.

This is the second RTL/2 development to be announced by the company, which is also working on an implementation for the Texas Instruments 990/10. It is also the second software release to be granted by ICI to Software Sciences, which has taken development and marketing rights to the Plant Control Package, also written in RTL/2 (CW, March 2).

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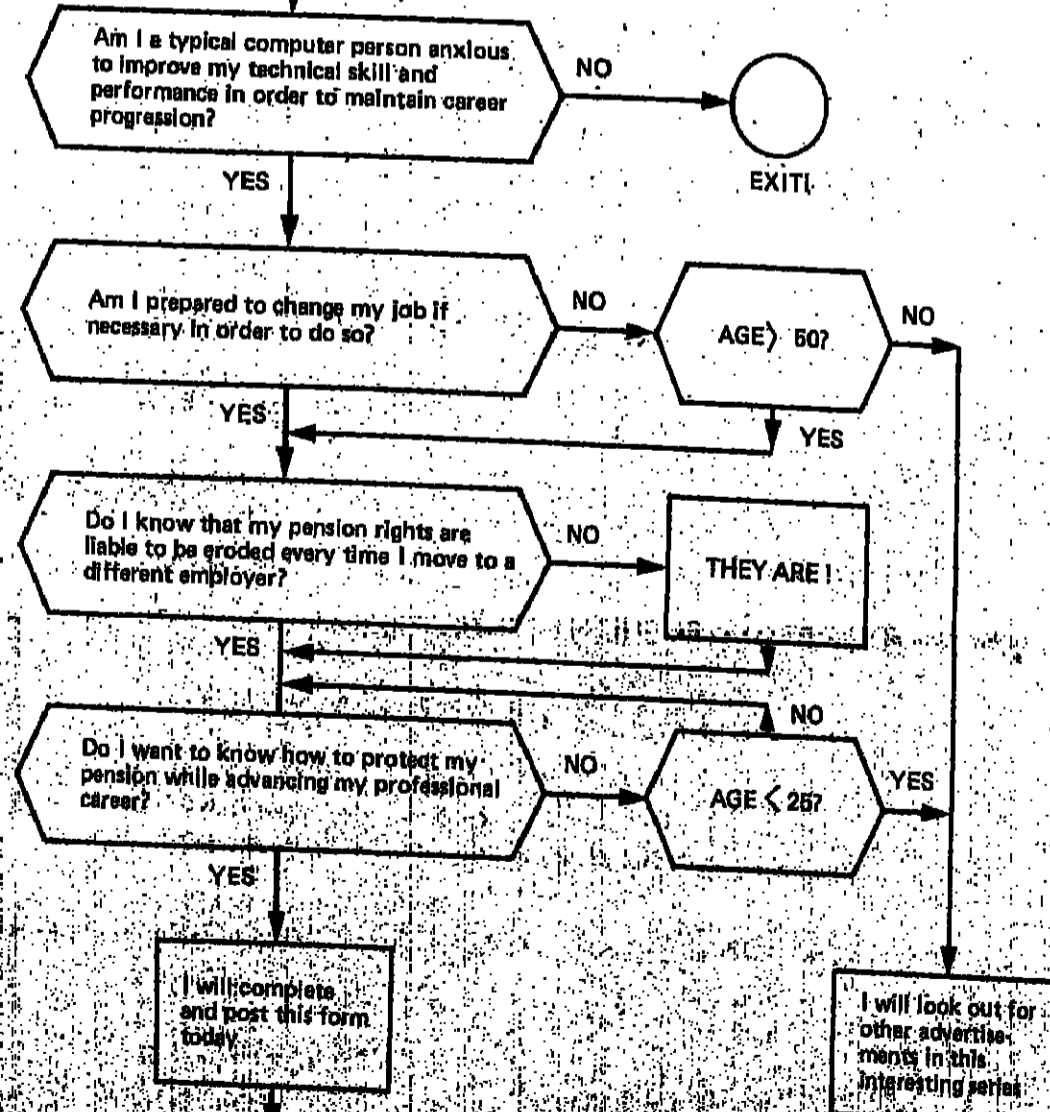
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senior lecturer in computer science at Queen Mary College, London, Mike Cole has specialised in automated office design and interactive systems. Gordon Cundrup was previously professional services sales with Control Data; Patrice Carver was a computerised typesetting as development controller with Harris-Intertype.

As senior systems officer with Humberdale County Council, Marco Kapp specialised in systems analysis and information development. Godfrey Thomas was business development manager in micrographic design systems for the Midlands and West of England with the Midland Bank, and Roger Thomas was previously



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INCREASING competition in the word processing business has produced a casualty, with Dataplex, the Croydon-based supplier of stand-alone machines, now in the hands of the receiver.

Already several firms are jostling for position in the race to take on the maintenance work for Dataplex's existing users.

Dataplex produced a range of stand-alone word processors, based on magnetic cards or floppy discs. The firm also supplied special purpose software for customers' own requirements.

As recently as March, Dataplex announced a new machine at the low end of the price range (CW, April 8). But the products

failed to match up to the competition. Some Dataplex users saw the collapse coming some time ago, and started to stock up with spare parts.

The leading contender for the maintenance business of the estimated 130 Dataplex users in the UK appears at the moment to be BDP Word Processing of Isleworth.

BDP held a meeting in London last Thursday at which 70 Dataplex Users were told of the move to BDP. The firm claims BDP is offering. The firm claims to have hired already about a dozen former Dataplex engineers.

Other former Dataplex staff are working in small firms in the same field, such as Fortronics, and it is expected that they also

will make bids for maintenance business. The main problem facing all these firms is the supply of vital spare parts.

Dataplex's stock is now in the hands of the receiver, and negotiations are taking place to see what will happen to these spares.

On Dataplex user, with about 10 Dataplex units, told Computer Weekly that it would be looking for a maintenance arrangement for about six months, simply to give time to find replacements for the machines.

BCS has a re-think

SENIOR computing professionals lacking formal qualifications can now be accepted for membership of the British Computer Society without passing the society's exams. The BCS council has decided on this

policy in order to give recognition to those who have achieved a high standard of competence in computing through their own experience, even though they had no formal training in the subject.

One type of person the BCS is thinking of would, the society says, be at least 35 and have had 15 or more years' experience in posts of increasing responsibility in computing. To assess a candidate's knowledge, he will be required to make a written submission on an approved subject and be interviewed. A report on the paper and interview will be passed to the Membership Board, which will assess this together with the candidate's experience and responsibility in the normal way.

For details of the scheme, which can be obtained from the BCS Membership Secretary at 29 Portland Place, London W1N

a new type of link.

On the positive side, the users praised the Processing Feature of the System 8 (CW, March 18) which is allowed them to do work which would otherwise have to be done on a minicomputer.

The Small Business Systems report costs \$395.

Insurance for freelance staff

PROFESSIONAL indemnity insurance for freelance computer staff can now be obtained through the Association of Independent Computer Specialists, which has negotiated special rates with Lloyds Underwriters. AICS can be reached at 8 Leicester Street, London WC2.

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Extel floppy disc store

USERS of printers and video terminals may be interested in a miniature floppy disc store introduced by Extel that can record 200,000 characters of data on a 5¼-inch diameter diskette. Called the Extel 950 Microdisc, it can be used instead of a cassette recorder for store and forward data collection and provides much faster data access times than a cassette.

The 950 is controlled by a microprocessor and records a file directory on each diskette as data is entered. File names can be assigned by the operator or automatically assigned by the 950. This makes the 950 suitable

for use as a database system with a microcomputer.

But the main application areas for the 950 are with low speed printer terminals, teletype compatible VDUs and buffered VDUs; in the latter case extending editing and formatting capabilities.

The 950 is manufactured in the US by Tectran Inc of Rochester, New York, and the mini floppy disc drive used in it is built by Shugart. The complete 950 unit costs \$1,160 plus VAT. A more powerful version, the 951, is expected to be launched later this year.

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Airborne systems to play major role

AIRBORNE computers from IBM are likely to play a major role in the updated version of the US Air Force B-52 bomber as well as being on board the NASA space shuttle when it lifts off from the Kennedy Space Centre on its maiden flight next June.

Flight testing has also begun on a new generation of IBM spacecraft systems, developed under a \$5 million NASA fund for the Marshall Space Flight Centre in Alabama. These systems are likely to be used in the Spacelab and Space Telescope projects.

Although not officially confirmed, it is understood that IBM's Federal Systems Division has been awarded the production sub-contract by Boeing for the supply of new computers for the B-52.

IBM is said to have proposed its AP-101C airborne system, which is in the same family as the AP-101 that will be on board the NASA Space Shuttle.

Although no official announcement has yet come from Boeing, the US Air Force's prime B-52 contractor, one of the competing companies has remarked that "IBM is the only company which has not received a 'Dear John' letter from Boeing."

"The other contenders for the sub-contract were Univac, Westinghouse Electric and Litton Systems.

Univac has said that it pro-

posed a "close relative" of the system that was selected for use on the B-1 bomber project which has now been shelved (CW, July 7, 1977).

Westinghouse on the other hand put forward its ANA YK 15A system which was developed for the USAF's Digital Avionic Information System project. It utilises the USAF-developed Jovial 73 language which is one of seven computer languages approved by the Pentagon for use in defence applications.

The remaining contender, Litton Systems, submitted its LC 4516 system which is said to be similar to the air defence system that was also selected for the B-1 bomber.

On the Space Shuttle, there will be five IBM AP-101 computers and they will form what is known as the Shuttle Avionics Integration Laboratory, described by NASA as "the most complex avionics system ever designed."



Riding atop a 747 carrier aircraft, NASA's Space Shuttle undergoes captive flight trials at the Dryden Flight Research Centre in California. But when it blasts off from Kennedy Space Centre next June on its first free flight IBM computers will be playing an important role.

Opening up a new world for people who are disabled

INTEREST in personal computers has, until now, been largely confined to hobbyists. The machines' capabilities are at present relatively limited, and practical devices such as home word processors are still some

way off. However, one application for personal computers that presents exciting possibilities of doing substantial good for people is in their use by the disabled.

Those who are so paralysed that they cannot move any of their limbs have an enormous problem, not just in controlling their physical environment (turning on the television, etc) but in getting any sort of interest out of life. The inability to do anything other than watch and listen passively is stultifying to the mind, particularly if there is no prospect of any improvement.

There are various devices such as the POSM (Patient Operated Selector Mechanism) which enable the severely disabled to work the television and light switches by moving a stick with the mouth or by sucking and blowing down a tube. However, these are expensive and limited in what they can provide for the patient. Thus the availability now of cheap, compact computers is opening up a new world of activity for these people.

As Julia Howlett of the National Physical Laboratory points out, it is very easy to connect a joystick control to a micro-processor to allow the disabled not only to play games and operate machines, but to learn to write programs. Introducing them to a whole new skill. For those who can move their head, an ordinary keyboard can be worked by a stick held in the mouth, making the operation even easier. The possibilities in this area are only just being discovered.

Chick Smith is a former army tank gunner who broke his neck while serving in Germany in 1959 and has lain flat on his back ever since. He can only move his head from side to side and slightly backwards and forwards. He lives in a foundation for the disabled in Edinburgh and can only be taken out on a stretcher; his life for the last 19 years, therefore, has been pretty bleak.

Four weeks ago, however, he acquired an Apple II personal computer, with which he is now learning to program in Basic. The keyboard has been modified slightly so that the shift and control keys latch; otherwise it is a standard unit with 16K bytes of memory, and interfaces to drive a colour TV and an audio cassette recorder. The fairly light keyboard is set up on a reading stand, like a small easel, on his bed, and he holds a rubber-tipped chopstick in his mouth to press the keys. "This has opened up a new world I didn't know existed," he says.

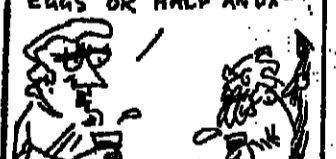
The system provides colour graphics, and a wide range of games. ("Don't knock the games!" he says). As far as learning programming goes, Smith admits the concept is totally new to him, and he is having some difficulty remembering all the rules, but he is confident

Knowledge of programming opens up for Smith a real possibility of getting a job, for the first time in 19 years. Suitable posts will obviously not be easy to find, but as interest in this subject spreads and the shortage of computer staff continues, opportunities for the disabled should improve.

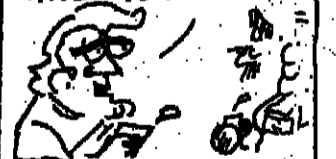
Micros could provide other benefits as well, as Paul Grant, teacher at a school for handicapped children, enthusiastically points out. Smith is an articulate talker, but many spastic children, though intelligent, are unable to communicate other than by grunts. For these, Grant says, a micro could be a "typewriter, notepad, reading book, picture book, dictionary, calculator, sketch pad, games compendium, music synthesiser and exam paper, all rolled into one."

Liveware Saga by Don

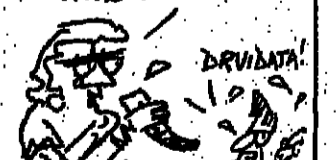
A TOAST, GENTLEMEN! TO THE SYSTEM WHEREBY - FOR 4 CHICKENS, 10 EGGS OR HALF AN OX -



...ALL HUMAN KNOWLEDGE IS YOURS AT THE TAP OF A HAMMER - I GIVE YOU...



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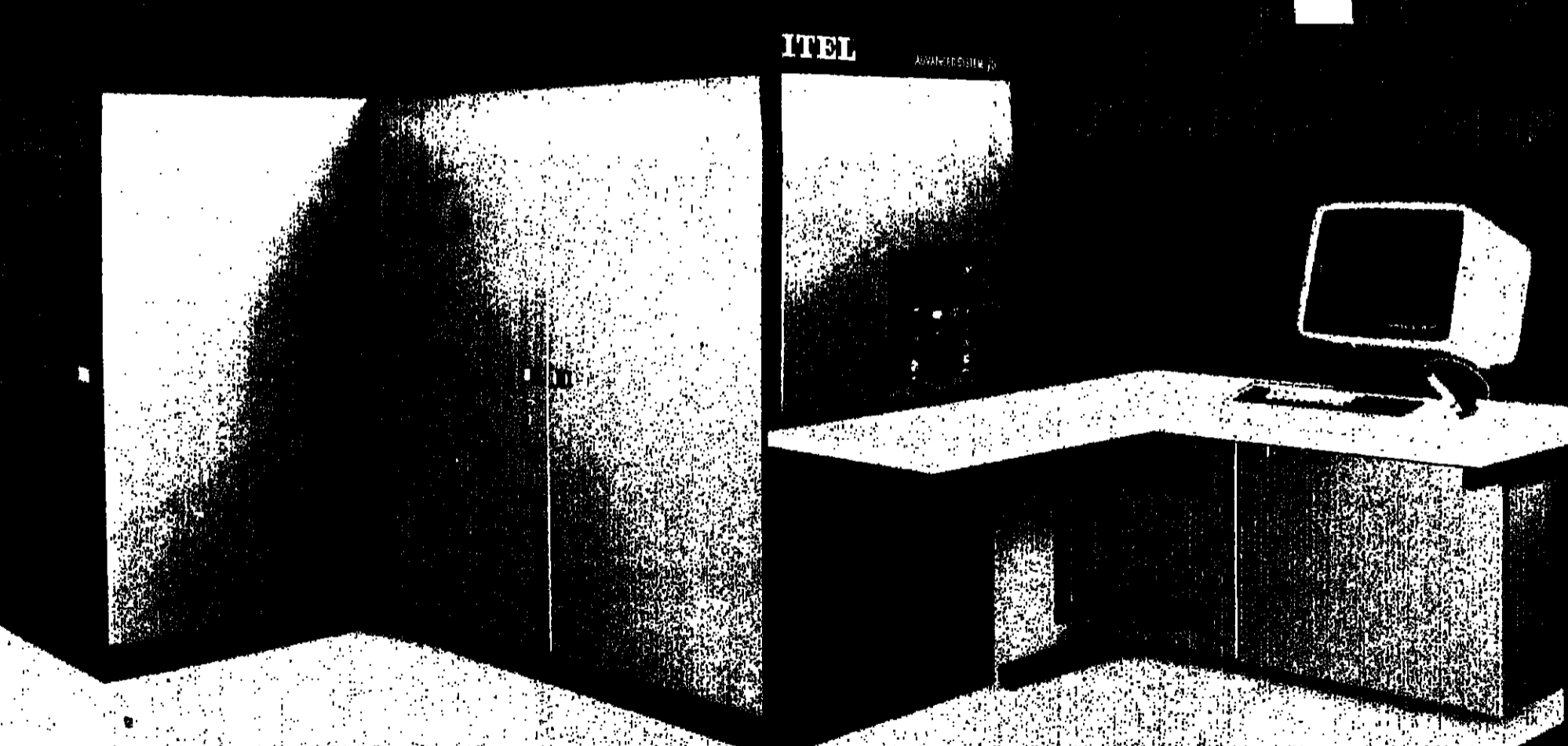


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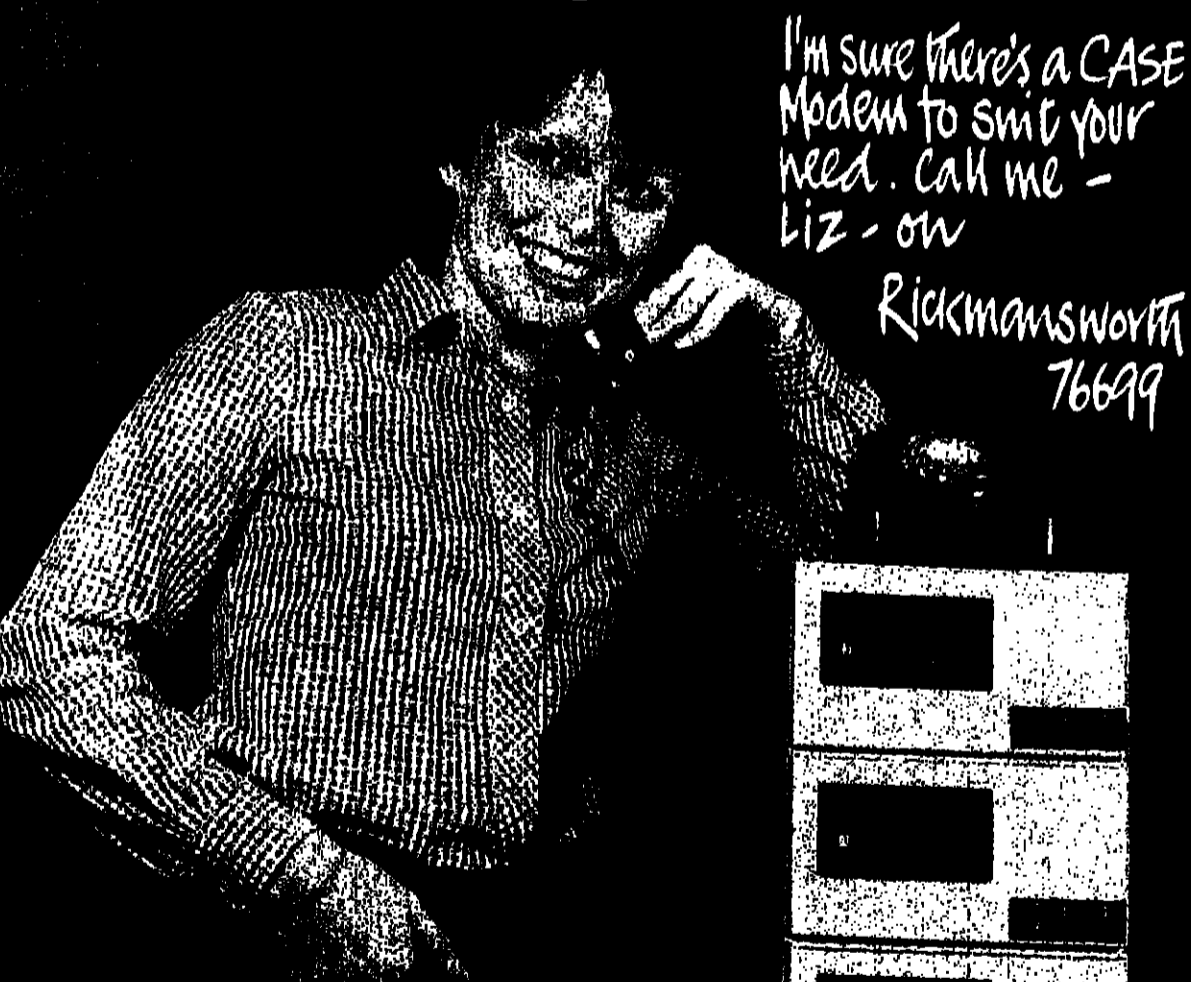
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Complexities of modern government

IS Dr Carl Hammer (CW, May 18) really quite certain that the complexity of the government of modern industrial States is a necessary adjunct to such States and a reflection of their own complexity, rather than an expression of bureaucratic empire-building — which is made all the easier with computers?

Dr Hammer mentions the 200,000 new laws passed in the US alone each year. How can anybody keep track? With computers, Dr Hammer would say,

but why is this necessary?

As it is, businessmen complain that the government makes so many rules, and changes them so often, as to prevent them from carrying out their real functions of wealth creation and the provision of jobs for those made unemployed by the computers. In short, it prevents the very complexity of society of which the bureaucracy is supposed to be a model!

No, the more complex the society, the more simple should be the ground rules in which it

operates. Only in that way can there be prevented the rigidities which, in a changing world, would otherwise cause the society to ossify, decline, and collapse.

The simpler the government and laws of a society, the easier it is for it to contain new, and more complex types, of human relationships.

C. G. BREINER
Haywards Heath, Sussex.



Dr Hammer

Interested in forming a computer AGIT group?

THE CW juxtaposition of letters (CW, May 18) by Tim Wickes (lack of venture capital for information technology) and Ivor Catt (reluctance of existing management/power structure to pass control to technology-savvy computerists, hence lack of real, coherent support for an information technology future policy), plus Tony Benn's reported call for a "company-by-company" examination of the effects of computer technology (CW, 25 May), perhaps together provide the trigger to decide that the time

has now come to press the Action Button to examine the issue defined in the recent ACM meeting and my article, "Time for City to back new technology" (CW, March 31, 1977).

Too much unco-ordinated discussion by too many (albeit august, erudite and even work-maniac) separate bodies on too vast a subject can only lead to severe doubts that a clear, coherent policy will emerge; that action will actually be taken based on this policy; and that the policy/action taken is realistic (whether "right", "good" or "bad" one cannot hope to decide without doing nothing or piecemeal something is useless).

Hence AGIT, Action Group on/for Information Technology. OBJECTIVES: If you don't know by now, it's not for you.

FUNCTION: Co-ordination of information coming out of all those myriad discussions/reviews/studies/investigations which are taking place. Definition of a realistic policy, quantitative and qualitative details fully worked out. Education: change, or use to good benefit, the fear born out of ignorance of the "masses". For starters, use videotape for AGIT's own information dissemination. Publicity: like any successful product, AGIT

must be well promoted and marketed. A media "celebrity" therefore a "must" as champion. Action: to get the power lines to implement the policy.

METHODOLOGY: See action minutes of any successful project team; no more than 7 active directors and 1 strong head. Permanent small secretariat. The whole supported by: 1. Membership. For starters to include BCS, IEEE, CSA, ACM, IDPM memberships, recipients of the weekly computer newspapers. Suggestions, please, for directors/head/chairperson. No-one who — but doing nothing or piecemeal something is useless.

Some say our (lack of a) position with regard to Information Technology is serious; could you get serious about AGIT?

Dr STEPHEN CASTELL
Witham, Essex.

Codasyl standard JCL apprehension

I MUST confess to a feeling of apprehension at the prospect of a Codasyl standard JCL, to be agreed "in about a year" (CW, March 18).

Language designs produced by committee are not notoriously sound. Witness to this is Codasyl's first product, Cobol, "which at first sight appears to be made up entirely of special cases" (D. W. Barron).

To be sure, Cobol is a praiseworthy pioneering attempt at a machine-independent language; but that's just the point: it is a pioneering attempt, not was. Cobol does have undeniable merits — its separation of the descriptions of data and processes; the division between physical and logical aspects of data description; the hierarchical approach to the latter; the provision of I/O exception declaratives — but all of these have since been incorporated into languages that are not only better in other respects, but have improved upon these merits. The success Cobol has had in the programming market-place is due to no continuing virtue of the language itself, but to the mighty clout of the US Defence department.

Moreover the Codasyl attitude towards updating their product is exasperatingly conservative. Why should a language intended for common use be tied down to the specific hardware peculiarities of one manufacturer, such as 18-digit computational registers (ANSI 74 Cobol)?

Just as bad is the lack of structuring facilities. Messrs. Bohm and Jacopini's studies on algorithmic structures have been available for more than a decade, yet not only did the 1974 Cobol standard ignore the need

for an in-line loop facility, but it appears the next standard will probably do so as well!

This conservative attitude towards development may incidentally help explain Captain Hopper's conservatism in his own use of Cobol. "I wouldn't dream of using a multiprogrammed IFs quickly" and "you always get better object code from a collection of simple IFs anyway. Nested IFs are a whole lot EASIER to understand in a compound statement facility, plus the ability to become difficult to understand in-line. As far as object-code efficiency goes, Captain Hopper's complaint applies not to Cobol, but to those manufacturers who, 20 years after the B5000, still cannot provide structured processors for the support of structured languages.

Codasyl's COSCL, "using current 'state-of-the-art' language techniques", is bound to be another pioneering effort. Let us hope that the BCS can persuade Codasyl to view the project as Dr Ian Newman does — as an interim step. They have Cobol after all, to stand as "an awful warning of the dangers of premature standardisation" (Barron, again).

"You should be glad that bridge fell down." Isambard Kingdom Brunel told the directors of the Great Western Railway — "I was planning to build 13 more to the same design."

Don Mills
Lower Hutt, New Zealand

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VULCAN is a comprehensive demand-paging virtual memory operating system with a simple user-oriented job control language.

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The System 120, part of the Harris series 100 range.

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Out-of-Focus view of operators

I HAVE for some years read your paper with interest, believing what was written to be fact not fiction, but following your Focus (May 11) I begin to have doubts. I wonder just how much some of your contributors actually know about the computer business.

For the past eight years I have worked in various computer operations departments, and never have I heard of the conditions set out in your article (ie coffee-breaks after half an hour, special attendance rules, etc). The statement "Many DPMs have graduated

through the operations department" is incredible. There may be a few, but certainly not many, and contrary to your comment those who do get there only too often forget the "snags" — and frustration of the job.

The writer's whole attitude seems to be one of sarcasm and criticism, and I feel sure that many hard-working and thoroughly conscientious operators are outraged by the comments. Perhaps next time he might like to write an article on the DPMs who treat their operators as some form of badly-paid, cretinous servant, as I am sure that this

situation is far more common than the one your article describes.

It is apparent that whoever wrote this sweeping denunciation of operators in general has had some bad experiences with a few of our number in the past, but please urge him to use common sense and not judge all operations staff on what are quite few.

London Colney,
Herts.

D. R. BALLANTYNE

MICRO NEWS

NEB faces tough odds in RAMS

THE new British memory maker, even with the backing of the government's National Enterprise Board, can almost certainly expect a hard fight if it is to gain a major share of the world market for 64K RAMs.

Indeed, the reaction of some companies already in the business has been to suggest that memories should be the last sector to attempt to enter now, especially as the prime target is the American domestic market.

But the decision by the Cabinet and the NEB to go ahead with plans to invest some £30 million in a group of expatriate British engineers, together with other nationals, to set up a British-based company, gives the UK the opportunity to snatch the lead in semiconductor technology away from the Americans for the first time and this in a market area which, at an estimated value of \$250 million by 1983, could become the biggest money-spinner ever in semiconductors.

The competition, however, will be fierce, and the production problems difficult to overcome. As reported, the Japanese company Fujitsu, has already introduced a 64K RAM, so the British company has a very limited time-scale in which to get set up if it is to be successful. Three US manufacturers, Intel, Mostek and Texas Instruments, are currently in the last stages of the design cycle, with first samples of the products expected by the end of this year.

The Fujitsu part has been called by some observers more of an engineering exercise than a real market entry.

This is because the memory, although of relatively small size at some 180 mls square, requires two rather odd voltage supplies to operate. These are +7 volts and -2 volts, and are needed so that a voltage swing of 9 volts can be obtained, thus making the design task for high performance easier. Most microelectronic equipment however, operates on a single +5 volt supply, and the Fujitsu part will undoubtedly cause some systems engineering problems.

Some samples of the Japanese device are already available, and Intel, Mostek and Texas Instruments are looking towards the year end to do the same. There has been speculation that limited production could even be started by some of them by that time, though most indicators point to the middle to the end of 1979, and probably even 1980, before volume production starts.

It is this time-scale that the new British company will have to match, and preferably beat, if its products are to stand a chance in the world markets, and a pattern seems to be emerging from the industry what the part should be like, if it is to succeed.

This pattern indicates that the memory should be 5-volt supplied, mounted in a 16-pin package with multiplexed data and address lines, and should be available by about 1980 with a 150 nanosecond access time.

This rough specification and time-scale, at which the US companies are already aiming, could then be expected to remove the threat of the Fujitsu device with its different power requirements. Observers however, indicate that if these targets are not met, the Fujitsu memory could well win out, just by being available.

The other major problem for the new company to overcome is that of production. Memories of this size will be using track geometries of 2-3 microns, half the size of current devices.

Getting down this small is pushing the capabilities of the current production techniques to the limit. The photolithographic method used to place the circuit element patterns on to the silicon, using normal light sources, can just about resolve such dimensions, and some manufacturers of the equipment are planning to use ultra-violet light sources of shorter wavelength to approach 1 micron resolution.

To get below these geometries, the ultimate solution will be to use either raster or vector scanned electron beams to "write" the circuit patterns on to the silicon. Half micron geometries can be achieved by this method, but it is both difficult and expensive to use.

A recent comparison produced in the US by stock analysts, Morgan Stanley, indicated that the equipment depreciation costs involved in processing good circuit wafers ranged from \$1.00 for current photolithographic techniques, to \$0.75 for electron beams. This means that each circuit would have to cost at least 30 cents, just to cover the cost of the E-beam equipment, without any amortisation for other production and test equipment, or production and assembly costs.

Editing terminal for Prestel

WITH the Post Office's Prestel videotext service now a reality, the time is ripe for launching equipment aimed at that market. The latest introduction comes from Jasmin Electronics, with VET, the videotext editing terminal.

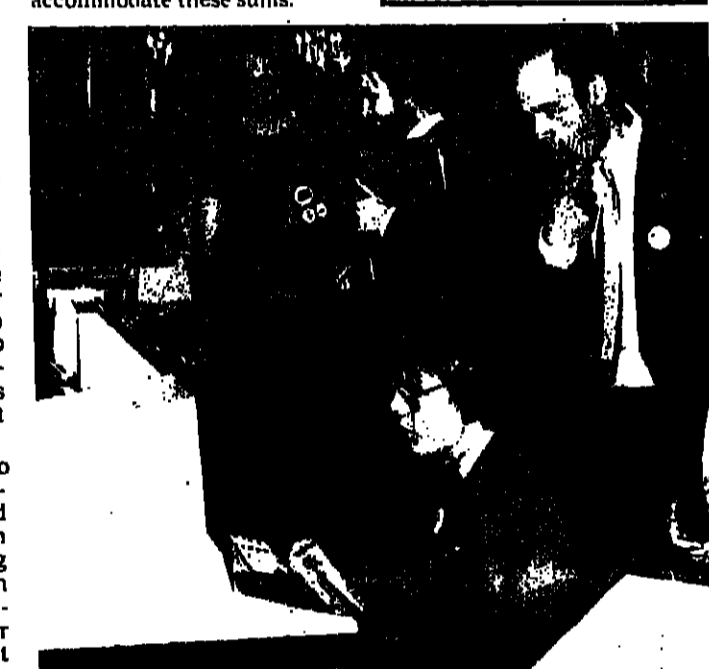
Aimed initially at the Information Providers for the Prestel service, the VET is a microprocessor based terminal designed to provide the IP with a free standing, remote job preparation and information transfer system.

It can, however, be used in a variety of other roles such as being a specialist visual display terminal with colour graphics, remote entry terminal, and data logging.

This variety of roles means that the VET can be configured, to meet the different requirements. For the Prestel IP, it allows up to 8K bytes of RAM to allow the offline generation of information pages for the sys-

Morgan Stanley indicates that a third, intermediate technique, known as Direct Step on Wafer also has recently been introduced. This is a development of the step and repeat printing process already used in semiconductor manufacture, and is capable of resolving 1-2 micron geometries with a wafer depreciation cost of \$7.50.

It will be interesting to see which of these three techniques the NEB-sponsored company selects. Initial indications are that it will go for electron beam processing. If it does the 18 to 24 months lead-time required to start up the operation may give it time to alter or at least accommodate these sums.



GETTING your hands-on was one of the advantages of the recent Commodore seminars on personal computing, "Petting for Beginners." Five Commodore Pet and two Kim 1 microcomputer systems were on hand for the delegates to practice. Four people, two on each day, walked away from the seminar with a system each as a prize. Winners of the two Pets were B. Hurdidge and J. D. Smith, while S. Gardner and M. Odlin won Kim 1s.

tem. Up to eight pages can be stored in this way and then transmitted to the Post Office computer during off-peak periods.

The operating system contains powerful editing facilities, together with operator prompting, held in ROM. This features page header identification formats, insert and delete blocks, lines and characters, transpose text, and open and close gaps in pages.

In operation, the CPU outputs a command to the 8273, such as general receive, or selective receive, and is followed by up to four parameters. The device then executes the command, leaving the CPU free for other tasks. After execution, the result is held in the 8273 for accessing by the CPU.

Mail order firm for Pet software

A NEW mail order software company has been established in London to specialise in program packages for the Commodore Pet personal computer.

Known as Petsoft, the company is currently producing its first catalogue of software, to include a range of games and small business packages which make extensive use of the graphics capability of the Pet. In addition, the catalogue contains an assembler, a range of maths packages, a payroll package, and a line re-number program.

The software has largely been written in the US, though some has been prepared by the company, and by freelance programmers in the UK.

Petsoft is based at 318 Fulham Road, London SW10.

Playing single card game

A NEW single card computer from US microcomputer manufacturer, Cromemco, is to be introduced into the UK by Comart. It is claimed to be one of the first systems that brings the flexibility of the S100 standard bus interface, used widely in personal computing.

Based on a Zilog Z80A microprocessor, the card specification includes 1K byte of static RAM, up to 8K bytes of PROM, and interfaces for serial and bi-directional peripherals. A monitor and control Basics are also

available, mounted on two EPROMs.

Priced at £345, fully assembled, the card marks a further step by Cromemco towards the industrial computer market, where it has been selling its Z2 microcomputer system as a "black" box. This system has in fact, recently been repackaged in a brown box, and is being called System 3. It incorporates the Z80 micro, 32K bytes of memory serial and parallel I/O and up to 4 diskette drives, and costs £4,175.

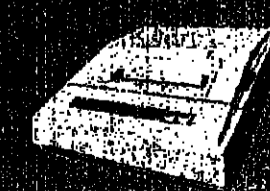
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Board takes tough line on standards

THE Computer Board is trying to ensure that manufacturers will cater for the architectural structure used in networking that has been suggested by sub-committees of the International Standards Organisation and the British Standards Institution.

This involves independent layers from the physical communications level to the host's job management software. These are implemented in hardware or software or both, but should be separable so that they can be changed as developments take place in any layer, or as alternative implementations are offered from other sources than the original.

At the physical end the recommendations of CCITT are known and defined and the Computer Board requires conformity with them; specifically level 2 of X25 for control of links to the network, which may be direct from the processor via a front end processor or a communications controller. And the operating system must be capable of handling virtual calls and packets in conformity with level 3 of X25.

At the terminal end connections are covered by X28 and X29 for asynchronous and synchronous mapping between them by X3, and the ability to communicate with these standard terminals must be provided from the mainframe end.

Moving away from the physical network connections the standards are less well defined and the concept of a transport station is still being translated into specific terms by the BSI's Data Processing Standards committee number 20.

This will also be a module or collection of modules that will handle allocation of network links, set up and control calls from end to end across the network and interface to higher level protocols.

Nearer the host high level protocols step in, and here there are no definite standards but the Computer Board has adopted

the File Transfer Protocol from the High Level Protocol Group, and this has been submitted to BSI and ISO. A virtual Terminal Protocol may also emerge soon.

In the case of job control, manufacturers must indicate below how their facilities may be

Stop spread of computers to save jobs, urges councillor

A COUNTY councillor from West Midlands has called for the spread of computers to be stopped in order to save jobs. Conservative councillor Sir Francis Griffin complained that computers are now being used to such a large extent that hundreds of ordinary people, and young people in particular, cannot find work.

Sir Francis pointed out that if at one time 400 or more people were employed calculating

INCREASED freedom for university users in selecting equipment and interfacing to networks should result from the tougher approach being adopted by the Computer Board on manufacturers meeting internationally agreed standards (CVI, May 25). The board's approach to standardisation was outlined in a letter sent to manufacturers earlier this year, which pointed out that from December 1980 manufacturers would have to meet certain standards before their tenders would be considered for university contracts and from January 1979 the requirements would be included in invitations to tender. Here DONALD KENNETT reports on the details of the Computer Board letter.

exploited in a network environment. Beyond existing and proposed standards manufacturers must

supply procedures to monitor traffic and resource utilisation, run diagnostics and aid module development by the user.

Stop spread of computers to save jobs, urges councillor

account of special circumstances and could never accumulate the experience and flexibility of a good human doing the same work, he insisted.

"If high pressure production techniques displaced humans then this has to be stopped," he said, adding, "I am not a Luddite — I am merely anxious that in all kinds of production discussions, the need to employ labour is the vital factor."

Sir Francis said that he refused to accept that computers are more efficient than human beings. They could not take

64K bytes of memory in Japan's 'single' mini

A SINGLE board mini-computer featuring 64K bytes of random access memory and a 16-bit single chip central processor has been introduced in Japan by Toshiba.

Known as the Tosbac Micro, the board is the first high capacity single-card system from a Japanese manufacturer. It features an input-output control unit, a clock generator, an initial loader, and is based on Toshiba's Tosbac-40L micro.

This is combined with memory unit constructed for 32, 16K bit RAMs.

Controlled by microprogram the system operates on a construction set of 148 instructions. It has a double bus structure consisting of a high speed memory bus, and a medium speed input/output bus.

Prices for the system are quoted by Toshiba as £1,100 for sample quantities, and £1,300 for quantities.

OP SPOT

It pays to stand up for your rights

TOO little notice is taken of the operations department until it ceases to function correctly for one reason or another.

Operations staff must "make themselves heard" to management and company health and safety officers to ensure that a high-standard computer room environment is established and maintained, according to Mike Evason, computer operations supervisor at Howard Tenens Services of Swindon.

He says that he has always followed this procedure and gives his own installation as an example of what can be achieved.

"We have a first-aid cabinet of the approved type, and our shift leaders are St John-trained in how to use it; we have automatic fire detection, with an alarm and dialling-out system; and a large, but necessary, data security system."

"Facilities are available for making tea or coffee on shift, and our operators may take a break to have a cigarette whenever they choose. We work on an 'honour' system which appears never to have been misused."

For operators who feel they are getting a "raw deal", he advises: "Inadequate fire or intruder security systems push up the insurance costs for the site — encourage your manager to look into this."

He points to the legislation in existence and says that health and safety inspectors have the power to see that it is enforced in factories, with the public health inspector having like jurisdiction over the "purely commercial office environment."

According to Evason, the Offices, Shops and Railways Act of 1963 has sections relating to both fire hazards and first-aid.

Referring to section 27 (1) of that Act, he says: "You are within your rights to refuse to work in an area that does not have suitable fire extinguishing equipment — in the computer room this means hand-held equipment or automatic CO2."

Quoting from section 28 (1) of the same Act he says: "A first-aid box or cupboard containing only first-aid requisites must be provided for use by the employees and be readily available."

He says that the above regulation almost always means a first-aid cabinet in the computer room for sites where shifts are worked, and adds that such a facility should be in the hands of a responsible person.

He continues: "It is worth noting that both the St John Ambulance and the Red Cross run suitable courses which in total cost less than £10 per person. Any relatively aware DP manager should be willing to pay for and encourage attendance by suitable staff."

In relation to staffing, shift work and rest-room facilities, Evason refers to the Health and Safety at Work Act.

"Under the new Health and Safety at Work Act (Section 2), it could be construed as not conducive to the welfare of an employee to work a shift on his own."

He points out that apart from the Act, it is inadvisable for a person to work alone "particularly at night", because he might make errors which go unnoticed, leading to reruns and further criticism of operations from other departments.

Mentioning the fact that a number of sites have no rest-room, he says that the operators should use the Health and Safety at Work Act "as a lever" at least to get facilities for making a hot drink.

"No member of staff must work more than five and a half hours continuously without a break of at least 30 minutes remote from his work," adds Evason, referring to the Act.

According to Evason, new powers are coming into force on October 1, under the Health and Safety at Work Act. Then it will be mandatory for a safety policy to be drawn up and displayed in all places where five or more people are employed.

Rees resigns as Opcomm chairman

PRESSURE of work has forced Mike Rees to resign as chairman of Opcomm, the operations group centred in Coventry. He is succeeded by Russ Bevan, the group's vice-chairman.

The loss of Rees is a blow to the group, for he proved a natural leader and was a driving force behind many of its activities.

It comes at a time when Opcomm is beginning to gather momentum, and has generated considerable interest, both among operations staff and in the computer industry as a whole.

Opcomm was formed in early February, with the express intention of creating a situation in which operations is recognised and accepted as a vital part of the industry, and accorded a status worthy of its function.

In this context, the group carried out a computer room environment survey, which was commissioned by Computer Weekly and involved contacting some 40 installations.

As a result the group produced a report which pointed to the lack of concern about the computer room environment, and which made recommendations for standards.

The group is also greatly concerned about the scant training accorded to operations staff, particularly new entrants. Because of this it is currently involved in a training project.

The next meeting of Opcomm will take place on Tuesday, June 13, at 8.00 pm, at the Sphinx Social Club, Rolls-Royce, Parkside, Coventry.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 8LL. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 8038.

By Bernard Allen

GEC pay dispute reaches deadlock



Hardie

AS the GEC operators' pay dispute approaches the end of its fourth month, a solution seems to be no closer than at the beginning of the affair.

According to John Hardie, who is a shift supervisor at GEC and the operators' union representative, "We definitely won't be giving in because all the operators need the extra money."

The operators have been very

active during the strike, regularly picketing the main gates at GEC's Stoke, Coventry plant. On one occasion the traffic outside the factory came to a standstill and the police had to be called in to get it moving.

They staged a sit-in at the company's contract engineers section on Tuesday, May 23, and followed that by occupying the computer room on the following Friday.

The operators vacated the com-

puter room when they heard that the police were about to be called in.

Says Hardie: "We were disgusted that we were going to be arrested — to be honest we didn't realise we could be put away."

Their next action will be to produce leaflets to keep other employees informed about the issue, and ask them, as Hardie puts it, "To black all input and output to the system and ban all use of VDUs."

HINT OF THE WEEK

Speeding up disc unloading in OS/VS

MUCH comment has been generated by the hint of a couple of weeks ago which explained how the IBM OS pseudo-writer, often called SCRAPIT or WTRZ, can be MODIFIED in order to erase unwanted output, other than the class Z output which it usually serves.

Last week Eric Murphy of Barclays Bank, Manchester, pointed out the risk inherent in this procedure — that other output may be erased unintentionally.

Now Barry Denyer, a senior systems operator with Lloyd's Bank in Worthing, Sussex, agrees and says that it is best to use the more conventional method — to RESET the output to the class served by the pseudo-writer rather than MODIFY the procedure itself. This is achieved by the following OS command:

E JOBNAME, OUT= Old Class, CLASS= that served by the pseudo-writer

Denyer also discusses further points about the pseudo-writer. He says, "Our pseudo-writer is called WTRZ and we give it an

identifier of P, which is very useful when it comes to closing the procedure down." He also gives the OS commands to start and close the procedure:

To start it: S WTRZ.P

To close it: P P

He goes on to discuss, and has a hint relating to, the allocation and de-allocation of devices in the OS/VS environment. Now in the normal course of events, UNLOAD and VARY commands do not take effect until a job goes into initiation, but Denyer has a way round this.

He says, "With a two system set-up, it is sometimes essential to vary offline or unload disc packs immediately, rather than wait for an initiation/termination."

To achieve this, he says, start a "dummy" procedure in a free partition. The procedure will itself fail with a JCL error, but will have the desired effect of unloading the discs. He gives an example of the OS command to start the "dummy" procedure: S D.PX ("X" represents the number of the free partition.)

R-range Facts

Hardware

R100	8 terminal data entry and distributed data processing system
R300	20 terminal data entry and distributed data processing system
R400	48 terminal data entry and distributed data processing system
R550	30 terminal mixed media data entry system
R830	8 micro terminal distributed data processing system
R850	24 micro terminal distributed data processing system

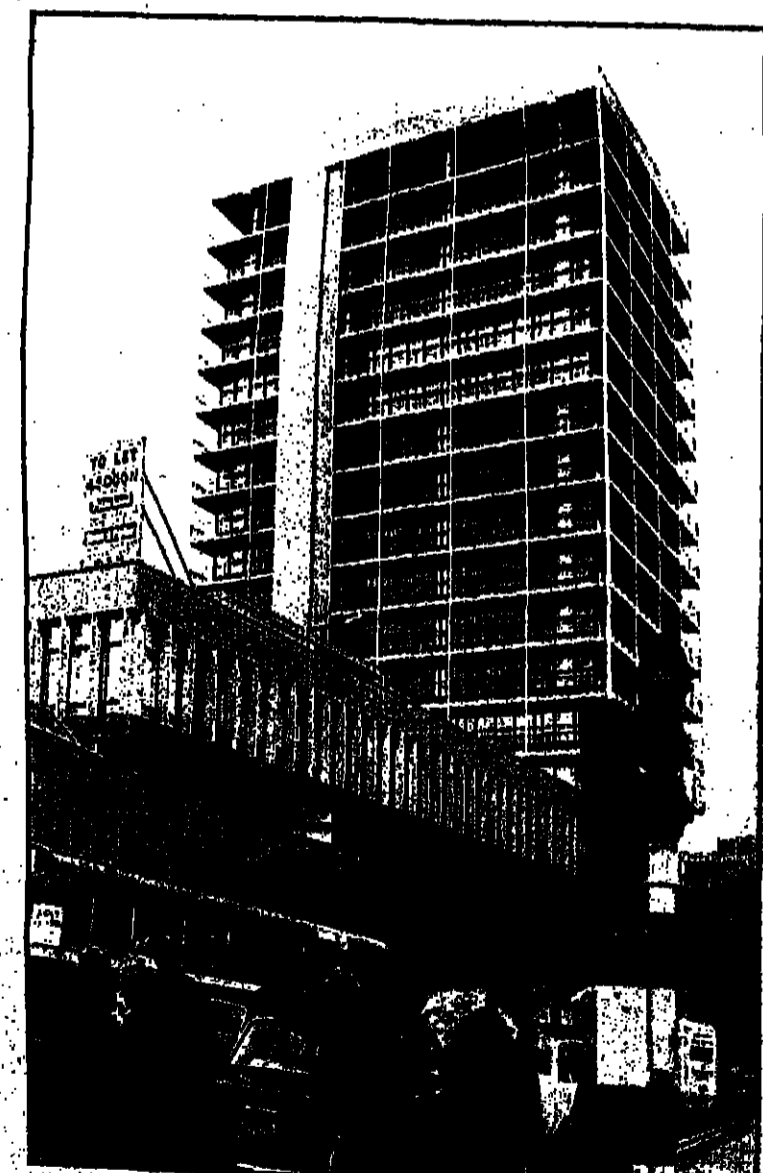
Software

	R100	R300	R400	R550	R830	R850
Multi-Tasking Operating System	•	•	•	•	•	•
Virtual Memory	•	•	•	•	•	•
Virtual Terminal Operation	•	•	•	•	•	•
COBOL-like Application Language	•	•	•	•	•	•
Format Language	•	•	•	•	•	•
Interactive Program Development	•	•	•	•	•	•
Test Editing	•	•	•	•	•	•
Systems Log	•	•	•	•	•	•
Operator Statistics	•	•	•	•	•	•
Re-entrant Code	•	•	•	•	•	•
Stack Processing	•	•	•	•	•	•
Independence of Data & Code	•	•	•	•	•	•
Structured Data Sets	•	•	•	•	•	•
Multi-level Indices	•	•	•	•	•	•
Multi-level System Security	•	•	•	•	•	•
Command Sequence	•	•	•	•	•	•
Data Entry Software	•	•	•	•	•	•
Distributed Data Processing Software	•	•	•	•	•	•
Dynamic Disk Management	•	•	•	•	•	•
Seek Optimisation	•	•	•	•	•	•
Full Range of Utilities	•	•	•	•	•	•

Data Communications

Burroughs TC 3500	•	•	•	•	•	•
Burroughs TD 830	•	•	•	•	•	•
IBM 2780/3780/3741	•	•	•	•	•	•
IBM 3270	•	•	•	•	•	•
HASP RJE	•	•	•	•	•	•
SDLC	•	•	•	•	•	•
ICL 7020	•	•	•	•	•	•
ICL 7502/3	•	•	•	•	•	•
ICL 7181	•	•	•	•	•	•
Redifon Synchronous	•	•	•	•	•	•
Redifon Asynchronous	•	•	•	•	•	•
Univac 1004	•	•	•	•	•	•

Yesterday's branch office



Today's



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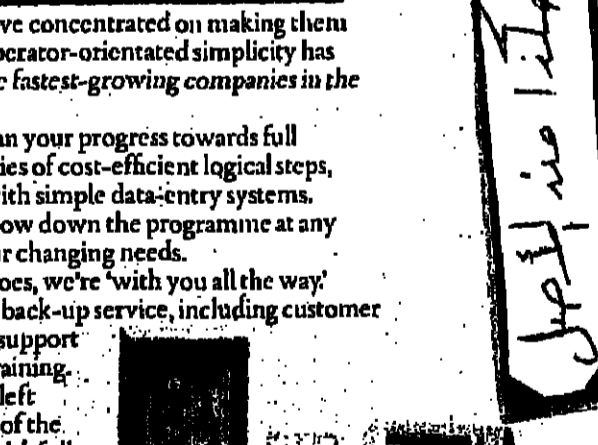
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The Computer Weekly/Dataskill essay competition Computerstyle 2000 proved to be so close that the judges decided to split the first prize between Bryn Jones of Haverfordwest and consultant David Butler (see front page). The

winning entries were of different styles. David Butler's took the form of an excerpt from A Social History of Britain in the 20th Century published in the year 2000, while Jones' entry, published here, was in story form. . . .



Once a week she went out to work. . . . She walked the whole two miles, enjoying the exercise.

By
**BRYN
JONES**

Alison worked for the Net (as did a fifth of the world)

As the lift was out of order, she walked slowly down the stairs to the fifth floor below.

Screens on the walls provided views of the village from the ground floor. She could see John entering the tobacconist's, presumably for his cannabis. She was retiring this year. She did not mind whether she did or not. Now she could devote more time to running meditation courses. She was 45 and had used her 20 years work allowance.

Although she was a modern languages graduate her work was not particularly interesting. She worked for the Net, as did a fifth of the world. Automated language translation had been moderately successful for a few years but it still needed people like her to help; either to check the correctness of the translations, or to edit the source documents for ambiguities or over-complex structures.

She used to give short courses explaining the pitfalls to users, describing how they should write to ensure near perfect translation. But the Net had taken this over, more successfully than she. Net instruction was now available at all levels on every topic under the sun. Over the last 30 years, more and more subjects had been added, larger, faster, and more intelligent systems had evolved, and most importantly, the Net was becoming completely ubiquitous. Further, many articles were now spoken or typed directly into the Net, which translated simultaneously, querying doubtful points as they occurred.

Once a week, she worked in the telephone centre. For the last two years, simultaneous voice translation had been undergoing public trials. It needed people like her to provide instantaneous solutions to the Net's fumbling, before the callers became too disenchanted with the system or with each other.

Four of them worked in the Northfield section on English-Italian calls, some interrogating the Net for aid with unfamiliar dialects and phrases, while others dealt with the calls. No more than two calls were allowed at one time, excess calls being automatically diverted to other centres. They could have worked from their homes, but not everyone had the expensive sets necessary for their work.

Although the trials were not very successful technically, conversations that limited themselves to simple sentences, clearly and slowly enunciated, were dealt with correctly and speedily, with very little repetition of doubtful words. It was already widely used commercially, but in the last few months it had gained more widespread social popularity.

There were plans to incorporate it into a sort of verbal penfriend service, where profiles of subscribers were input to the

Net so that people with similar interests could speak to each other on a worldwide basis. Several callers could be connected to each other simultaneously, but it would be some time before any translation systems could cope with such multilingual facilities. A good thing, perhaps, as it would encourage people not to interrupt.

She was pleased with developments because they would prevent English gradually displacing the rest of the world's languages. She had no doubt that within her lifetime, as communications costs dropped, video phoning became widely available, and simultaneous translation began to work reasonably well, society would be revolutionised.

She knew that Riyadh University was working on audio-translation that imprinted the tones and inflections of the speaker's voice on to the translated voice and it was expected that such developments would quite soon reach fruition.

In Britain, descriptions and partial histories of the whole population were in the Net, but very classified and restricted. She supposed that one day,

same whether she worked or not, and she could have days off or change shifts at any time by asking the Net to find a replacement, of which there were plenty.

After work, the four of them went off together for lunch. A new girl asked whether she had children. "No," she replied. "I decided to leave decisions about marriage and children until I was 30, and then soon after that I decided to accept a voluntary sterilisation grant, one of the first, partly for altruistic reasons, and partly selfish. I suppose, although I felt I wouldn't become a slave to my genes."

"Grants were smaller then, weren't they?" "Yes, but they would also have got smaller as I got older, and they are bigger for men, all rather unfair, I thought."

"I don't think so, although it will be nice to see the population halved, with cities replaced by countryside. I hope that my children see it."

"If you have children, then they won't see it, because that's what keeps the population up."

"That's enough, you two," chipped in John, looking at Alison. Not particularly

She knew exactly what was stored about her in the Net, although she was unsure about what her Set knew and what the Net knew. Between them they knew her fingerprints, voice, medical, educational and work histories.

when the whole world was in there, some committee would have the bright idea of releasing personal details of everyone into a more public level of the Net in order to facilitate international friendship.

Was it a good thing? Argument was rife. Primitive information processing she had ignored, but the development of dirt cheap, virtually infinite memories in the early 80s had wrought cataclysmic changes. Hundreds of hours of videorecording could be stored in a device that fitted into her pocket. And the same devices were used to store gigantic logic that was beginning to analyse the videorecordings with increasing sophistication. She knew that the next generation would find it all commonplace. Technology taking them over, she supposed.

Today she was working from 8 am until noon. She felt almost as if she was in a normal, old-fashioned job. She liked this shift best, walking to work in the early morning. It was a four-hour shift every Friday that she worked, from midnight to midnight. Tomorrow was to be the weekend she thought. She worked about 15 or 20 hours a week at home. She was paid the

attractive, a slight moustache, but a very pleasant face, he thought, the heavy eyelids imparting a rogues look belied by her gentle character and the vital expression in her eyes.

Alison caught the look, deterred him with "It's not appropriate that you butt in," but nevertheless invited them all back to her flat.

They couldn't come, and at home, Alison slumped despondently in front of the omnipresent Set. It knew a lot about her, some from the national files, and some that she had told it. She could have news and articles in sound, vision, or on paper. It used a level of language suitable for her, and even presented some Italian or French to add some interest to her life.

She didn't like technology, but she had to admit that her Set was very nice. She had won it in one of the interminable competitions and raffles on the Net. It had quadrasonic sound in four rooms, five screens, two cameras, and enough storage to leave the cameras on for six months. It was becoming or taking over the roles of TV, programme retriever, record player, tape recorder, radio, alarm clock, videophone, newspaper, credit card, calculator, cinema, library, publisher,

educator, estate agent, building society, travel agent, electoral register, polling booth, National Payment assessor, job finder, friend finder, bank, bookmaker, bingo club, office, postman, mail order catalogue, stockbroker, solicitor, medical adviser, where would it stop, she wondered.

The Net charged for most services, but was usually very cheap. It had gone through an aggravating phase of constantly revising prices according to demand but this was steady now. She could choose the advertising content to suit herself and her pocket, but new films, plays and music were exorbitant even with 20 per cent advertising, and she usually asked friends in to share the cost.

The demise of fixed time TV was a boon, although as Coronation Street was released to the Net on Monday and Wednesday evenings, some addicts had not noticed much change. But to her, being able to call up a selection from some 50 or more years of films, music, and programmes was distinctly good. Her favourite pastime, though, was to browse through the poems, articles, literature, films and music put into the Net by private individuals and groups at their own expense.

They could charge any price for access, but as only the famous few made any money from it, most subscribers allowed free access.

There was such a plethora of creators seeking attention for their work that it would take her until she died to sift through an increasingly small proportion of it. The Net gave her some help with selection on the basis of content, and of the age, sex, education, and interests of the author, but to date had been hopeless at judging style. It managed automatically to eliminate some explicit violence and pornography from access by youngsters, and there was also a very large panel attempting to grade all material.

Some people were advocating that no ungraded material should be allowed into the Net, but at the moment, this would mean a waiting list of two years. Self grading was allowed, with deliberate misgrading being penalised by varying degrees of Set access restriction. She had applied to work as a grader but her unorthodox views had been held against her.

She watched the news, or rather the subset that her Set had selected for her.

Someone was sabotaging the Peking node of the Net with mischievous messages but a few thousand devices from the micro mountains in the Central American Economic Community would cure it, until the Net security system developed its own defence. . . . The UN announced that absolute security and privacy of information in the Net was guaranteed within 12 months. . . . The Palestinian had hijacked an Israeli space station. . . . Portugal was proposing to become unsettled. . . . A woman in the States had been awarded massive compensation for loss arising from wrong information about her held in the Net.

Nothing new she thought. She had often wondered about emigrating to a settled country, but in general, was satisfied with Britain. She knew exactly what was stored about her in the Net, although she was unsure about what her Set knew and what the Net knew.

Between them, they knew her fingerprints, voice, medical, educational, and work histories. All her requests of the Net since its inception, and more recently

Each year nearly 3,000 managers from commercial, industrial and government organisations attend general management courses provided by Ashridge Management College. Though most organisations have been computer users

for years, personal contact with a computer system is a new experience for most of the students. Here, LAURA TATHAM describes the computer-based studies at the college which form part of the overall management courses.

The college where managers learn about computing

EVERY year, some 3,000 managers of all levels attend courses provided by that prestigious educational establishment, Ashridge Management College. Many of these come from top commercial, industrial and government organisations, the most of which, it may safely be assumed, have been computer users for at least 15 years.

Yet, says David Hutchings, who is in charge of the college's computing facilities, personal contact with a computer system is a new experience for the majority. This supports the contention of writers in Computer Weekly and other journals that most British managers have a disarming lack of first-hand knowledge about the practical application of computing techniques.

Probably at least some of the blame for this situation lies with computer-using organisations, for Ashridge students respond with keen interest when given an opportunity to witness demonstrations and to use interactive systems themselves. Indeed, one student, armed with a code for access to a remote time sharing service, asked if he might use a college terminal to discover what his company was doing—a request that, disingenuous or not, was predictably refused.

Invitations to view the Digital Equipment PDP-11/34 system at the college has recently installed are also generally accepted with alacrity.

Ashridge's courses, held in the college itself or in-house for individual organisations, cover a wide spectrum. Though they do not include the basic aspects of computer science, such as programming, computing facilities are used in at least half of them. Nearly every general management course, for instance, includes a computer-based exercise, marketing being a favourite subject. Senior management courses involve at least one computerised case study.

Typical subject for demonstrations on a terminal are mortgage calculations and discounted cash flow and techniques like linear programming and statistical analysis. A program written by Ashridge staff is designed to show that computers can deal as easily with alpha as with numerical input. A financial modelling and an economic forecasting package are also among those that have been written in-house. It is emphasised, however, that computer-based techniques offer only a few of several approaches to problems and are not an end in themselves.

Course members are also encouraged to use terminals for themselves. Available programs include the Apollo landing exercise and Nim, a game designed to test capacity for logical thought.

The college's remaining 50% of computer usage is accounted for by research carried out by its tutorial staff or as an adjunct to the consultancy assignments carried out by many of these and for which clients have to pay.

Since the inception of time sharing service bureaux some eight years ago, Ashridge has drawn on these for its require-

ments. Its experience has been eclectic, having included Telcomp, Timesharing Ltd, Honeywell-Bull, GEIS, Call-360 Comshare, W.S. Atkins, University Computing and Honeywell Mark III, among others.

Hutchings' account of the reasoning that led to the decision to install an in-house system is likely to be of interest to all those currently thrashing out the great minicomputer time sharing debate. One factor, though not of overriding importance, was costs. Those of the bureaux themselves are steadily rising. Line usage charges have increased steeply during the recent past. Of around £12,500 spent by the college last year, about 25% went on line charges. A further £2,500 or so was spent on terminal rental. While expenses could have been reduced by renting a dedicated line to a single bureau it would also have entailed a sacrifice of flexibility.

A counter argument that appeared, at first, to carry considerable weight was that a change to an in-house system would preclude the use of the large libraries of packages available through time sharing bureaux. Hutchings and his assistant, Sheila Burrell, however, found that only two or three such packages were used frequently and even these had been modified to suit the college's particular requirements. Nor, of course, would the acquisition of an in-house system rule out the occasional use of a time sharing bureau for, say, research.

A strong argument in favour of an in-house system was availability. Almost all time sharing services operate only during office hours. This was inconvenient for Ashridge, since teaching does not end until 9 pm each day. To arrange timetables so that terminal demonstrations were given between 9 am and 5.30 pm was not difficult. But the only opportunities for students to use terminals informally, either for study or recreation, occur during evenings or at weekends.

Why, specifically, the PDP-11/34? It would be unfair to imply that the Digital Equipment system was chosen by default. In fact, investigation into minis in the £30,000 to £250,000 bracket showed that the PDP-11/34 was admirably suited to the college's requirements. The hardware was known to be reliable and the Basic-Plus compiler a good one. There was also a possibility of future co-operation with the manufacturers in writing new software.

On the other hand, competition for the order, which one might reasonably expect to be considerable in view of the college's high reputation and the opportunity of exposure to so many management students, was disappointingly small. Hutchings reported. Some companies did not respond at all to requests for information; others sent sales brochures which they did not follow up with a telephone call, letter or visit. At least one representative made an appointment that he never kept.

Whether this pathetic attitude, which was shared by

the US companies alike, was due to ignorance about the character of Ashridge, a belief that one potential minicomputer sale was not worth bothering about, or simply poor management, is anyone's guess.

The Ashridge PDP-11/34 is installed in a small room that was once a tinied food store, where it operates unattended. Its main features are 64K words of memory, half core and half MOS to allow automatic re-start after power failure, two



Ashridge Management College.

DECpack disc drives with 2.4 Mbyte exchangeable discs, a 180 cps DEC matrix printer and a DECwriter for console terminal. The current total of nine terminals includes teletypes, VDUs and portable units, which it will shortly be possible to plug in at many different locations. The existing two lines into the computer will soon also be increased

to eight lines. An interesting point is that the VDUs, which work at 9,600 bps over about 300 metres, are operating on only a single twisted pair of wires—which theoretically is impossible. Software includes the RSTS operating system and compilers for Basic-Plus, APL and Fortran. Now that there is an in-house

system, Hutchings is keen to develop facilities for its usage as a kind of superior pocket calculator for use by course members and others. Talks with Digital Equipment people are now under way on this, and on the possibility of developing further software for the extension of the problem-solving aspects of computing.



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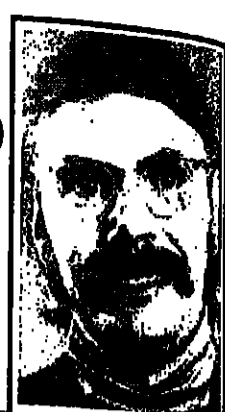
Due to a requirement for finance for expansion, a whole or majority shareholding is available in a software house/bureau with a good reputation in a specialised financial area.

Revenue is half from systems and packages and half from production. Last year's revenue of £140,000 can be rapidly expanded.

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BOX 1962

cheat, no list

Services companies taking big strides towards success



Tim Palmer's Indian report

DESPITE a rigid government framework which tends to be prohibitive rather than permissive, the Indian computer industry has taken major strides in the four years since Computer Weekly's last series of on-the-spot reports, and small and ambitious computer services companies have sprung up all over the country.

Nearly all the major mainframe and minicomputer manufacturers are represented by at least a handful of systems in India, and several, notably Univac, Burroughs, DEC and Data General have commis-

sioned Indian companies to write or adapt systems and application software for them.

As enunciated by the Electronics Commission, the supervisory government body within the Department of Electronics, which looks after the computer industry, the regulations under which business can be done in India are extremely restrictive.

However, the EEC delegation found that many things were being done by Indian companies which appeared to fall outside the guidelines laid down by the Commission, and the prospects for business are thus better than

they appear to be when viewed from New Delhi.

The state of development at the mainframe end of the industry is in sharp contrast with that at the microcomputer level: largescale mainframes in India, which include an IBM 370/155, two Burroughs B8700s and a DECsystem-10, as well as several Eastern European mainframes which match medium and large IBM 360s, are used almost exclusively in batch mode, and there is no data communication as yet because India's telephone facilities are inadequate and will probably

remain so until the first domestic communications satellite is launched in two to three years.

However, at the other end of the scale, several companies have designed and built microcomputer systems for business applications which are at a comparable state of development to those being built in Europe.

Noteworthy in this context is Hindustan Computers, which was incorporated only in August 1976, but developed in rapid succession a desk-top programmable calculator, a floppy-disc backed business system, an

electronic cash register and a key-to-mini-floppy-disc data entry system.

The calculator uses the Rockwell PPS-4, a 4-bit micro and the other devices use the 8-bit PPS-8. The Intel 8080 is used as a controller for the Polish-built LX-180 printer on the business system, and a special floppy-disc drive controller was developed which allows a minifloppy drive to be used with one or two standard floppy drives.

In its first year of trading, the company sold 180 calculators and 45 business systems, chalked up a turnover of £1.3 million, and looks for £1.5 million in the year to March 1979.

Software developed includes a proprietary language based on Cobol and confusingly called Basic, which includes input-output edit statements and built-in sort routines, with the interpreter stored in ROM.

Hindustan Computers employs 400 people, 65 of them working on hardware and software research and development, and is keen to co-operate in Third World countries on projects involving writing software for the latest microcomputer hardware. It would also like to export its products to other Third World countries.

Government policy on joint ventures normally restricts the foreign holding in any new company based in India to 74%; in practice foreign companies are likely to have to fight to be allowed to have more than 40%, and IBM left India on June 1 because it refused to dilute its 100% holding. To get a larger stake in a joint venture company, the foreign organisation has to be bringing in advanced technology which the government deems essential to India's requirements, and to export a large proportion of the output.

Burroughs has formed such a joint venture with the giant Tata conglomerate, in which each party holds 50% of the shares. But Tata-Burroughs is exceptional: most US and European computer companies sell in India through agents and have no direct financial stake, and the first question the government asks is whether any foreign equity participation is necessary.

The government was unable to make clear its attitude towards the import of software, whether for use in India or for enhancement and re-export. Theoretically the rules are strict, and an import duty of 40% is involved; in practice a way may be found to circumvent this.

The rules governing the import and use of computers in India are also strict; the basic approach is that computers shall not be used for any application which displaces labour; their use is to be confined to applications which would either otherwise be impossible, or where the use of a computer confers a unique solution in terms of reliability or efficiency, as for example in precision engineering process control or airline reservations. On the other hand, apart from the State Bank of India, which does have a Burroughs B1728, there are virtually no computers in Indian banks.

The import of computers is tightly controlled by the Electronics Commission and appro-

val is only given once certain foreign exchange earnings conditions have been met, and then too only when the computer is to be used for one or more of a number of approved applications.

Broadly, the approved applications are education, production planning, design, marketing, research and development, defence, aerospace and process control.

Companies are permitted to import computers for use in development of software for export, because this kind of work is being encouraged, but Catch 22 is that it is normally necessary to show that some export success has already been achieved before the licence is granted. Thus it tends to be easier for large diversified companies to import machines, such as Shaw Wallace in Madras, which brought in two Datapoint systems which will be used for software development and re-exported to Malaysia for a major plantation information gathering system.

The rapidly growing means of setting up a computer services company in India is the use by Indian nationals of capital carried abroad to buy and import a computer. Several of the companies visited by the EEC delegation were formed in this way, but the same restrictions on usage apply: individuals are unlikely to get an import licence unless they propose to use the machine for something more than straight commercial bureau work for at least some of the time.

The import of expertise is another thorny subject, and in theory it is difficult for a foreign company to arrive in India with expertise or special knowledge to sell and find a buyer.

According to the government proposals for import, such "know-how" has to come from an Indian company, and a very good case has to be made for its necessity before an import licence will be granted. Import duties are levied at a rate applicable to the particular sector in which it will be used: computer sector imports carry a different rate of duty from petrochemical imports.

The impression left with the delegation by the government was that anything which was not actively encouraged was not possible, and that at least in the early stages of collaboration, procedures would be extremely slow and complex.

However, an intensive 10-day tour of companies and organisations in Bombay, Madras, Hyderabad and Delhi presented a very different and much more encouraging picture.

Several companies had already built up valuable experience on overseas contracts, the range of computers, particularly modern minis, installed in the country is growing rapidly, and the era of data communications is dawning. There is even a company in Bombay in close consultation with Teletel about the possibility of affecting satellite access to the US communications company's packet-switched network.

Such a link would point up the irony that while it is possible to dial London direct from Bombay, there are people in Bombay who have been waiting for a telephone since 1963.

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COMPUTER SECTION
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Closing date 18th June, 1978.

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Applicants should have at least six months' experience in writing COBOL programmes.
Closing date 18th June, 1978.
Applications in writing giving details of age, qualifications, experience, together with any other supporting information and the names and addresses of two referees should be forwarded to: the Head of Personnel and Management Services, Halton Borough Council, Municipal Building, Kingsway, Widnes, Cheshire.
Municipal Building, Kingsway, Widnes, Cheshire. S. Turton, Chief Executive.

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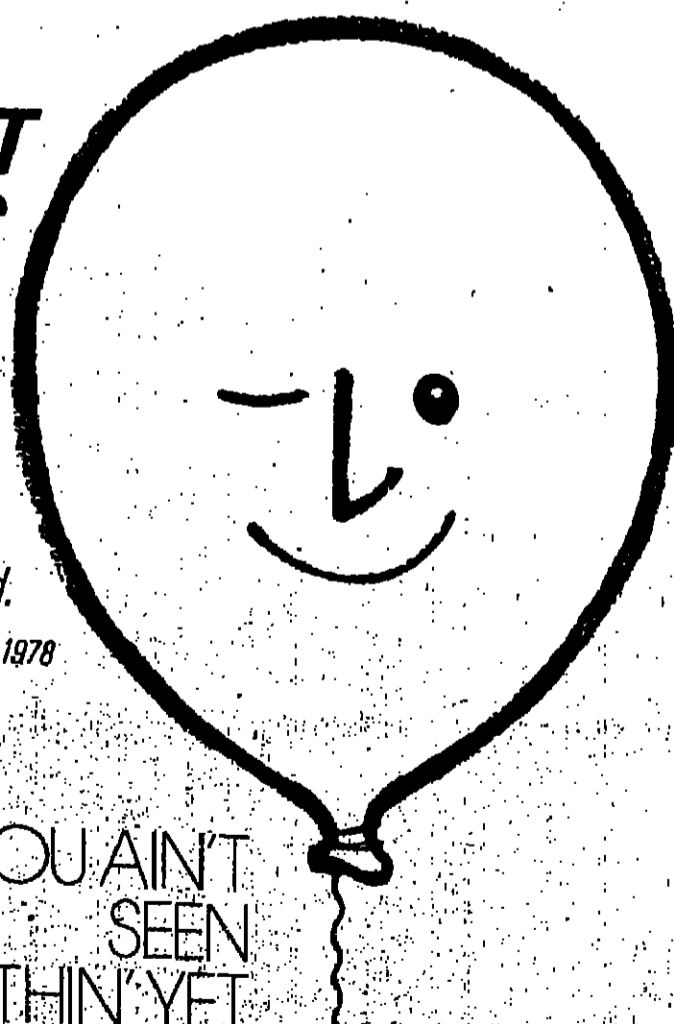
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Senior programmer and experienced programmer required. Applicant should be experienced in COBOL and preferably be familiar with IBM equipment. The successful candidate will control a small team working under a project leader and will be expected to undertake some systems design and systems testing.

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Applicants are invited from experienced BAI programmers that wish to become system programmers. Candidates should be able to generate a DOS/VS system and have some experience of COBOL CICS/VS and power/VS. The duties will include the maintenance of the above products, performance tuning and the upkeep of other software as well as assistance to the system and development. Starting salary for both posts APS/4 £3,305-£4,214 (inclusive of supplements). The council operates on IBM 370/135 and a DOS/VS. A variety of financial and other applications are presented currently and it is intended to expand the existing self-programming system and introduce new data-based techniques. Application forms and further information from Miss S. Berman, Borough Treasurer's Department, P.O. Box 10, Watford House, 25-27 Watney Road, Bole M22 1AL, Tel. 045 508 8181, ext. 242. Completed forms should be returned to the Borough Treasurer by 15th June, 1978.

Your chance for Management

ANALYST/PROGRAMMER

BRENTWOOD, ESSEX c. £8,000
Now is the time to start thinking seriously about your future. The year is left gone and still you're mending along doing the same old job. Well here's your chance to change all that! Our client is a large revenue company. They have recently installed a new IBM System 32 at their modern offices in Brentwood, and they are looking for an Analyst/Programmer with good RPG II to head the department and become responsible for the design and implementation of systems planned for this year. If you have at least 3 years' D.P. experience and feel that you can meet the challenge of this demanding position - call now for an immediate interview.

SYSTEMS ANALYSTS

HERTS. £4000-£6000
Why continue? Why not take a local job offering similar salaries, fringe benefits and certainly offering a better quality of life. Our client is a major installation based in rural Hertfordshire. They are looking for additional systems analysts at all levels of experience, ranging from visual ranges to those who have already made a major contribution to the implementation of at least one major system. Career prospects are good, fringe benefits attractive, and relocation assistance will be given. We certainly recommend further discussion.

SENIOR ANALYSTS

CITY £7000
Our client is a major U.K. shipping and container transport business. Their substantial investment in Data Processing is based on IBM 370 hardware providing extensive teleprocessing facilities. Business expansion and hardware growth are the contributing factors to their need for additional staff. Applicants should have at least two years' systems experience coupled with some knowledge of on-line applications. The exact salary is negotiable and fringe benefits are all you would expect from a company of this stature.

SENIOR BUSINESS ANALYST

LONDON c. £7500
A large software house, shortly moving to new premises in the West One area, is currently seeking a Senior Business Analyst, to join an expanding team of consultants. Applicants, who should be fully conversant with IBM mainframes, will have spent at least 5 years in Data Processing, of which at least 2 years must have been spent in a systems position. The ability to write in Director level is essential. This is an ideal opportunity for anyone seeking progression and responsibility. Remuneration consists of full travelling expenses, BUPA and twice yearly profit sharing scheme. Interested? Then call now for further details.

West London

SYSTEMS PROGRAMMER APPLICATIONS PROGRAMMER

c. £7000
Our clients, one of the largest suppliers of systems software in the world, are looking to recruit the following:
SYSTEMS PROGRAMMER - to take the role of 'Project Specialist' you will become involved in the field support of our client's systems software, which will involve regular international travel, and a great deal more.
APPLICATIONS PROGRAMMER - you will already have at least 18 months' experience as an IBM Assembler programmer and be willing to 'go it alone' in a hectic environment. You will certainly receive just rewards for your efforts. Our clients offer excellent conditions of employment, and the above salaries can be exceeded for exceptional applicants.

PETROLEUM ANALYSTS

TO £8000
Our clients, a world force in the Oil industry, are seeking to recruit top analysts for their Business Systems Development group, based in Central London. Applicants must have at least 3 years' systems experience, preferably gained in an IBM environment and be willing to travel internationally. Conditions of employment are outstanding.

CHIEF PROGRAMMER

ESSEX c. £7300
A leading manufacturing company based in rural Essex is currently seeking a Chief Programmer to complement their expanding Data Processing Department. At present it comprises an IBM 370 running under DOS/VS, with a large telecommunications network. Applicants should have a good knowledge of COBOL, RPG II or ASSEMBLER, and should have spent at least 18 months in a programming environment. The positions offer scope for advancement within an area of Data Processing which is by far the most progressive in the industry. The top range salary quoted is what you can and should expect if you're good enough. What's more, it's what our client will pay. If you think that you are ready for a change for the better, then call now for further details.

PROGRAMMING OPPORTUNITIES

HERTFORDSHIRE £6000-£8000
A number of vacancies have arisen in the Hertfordshire area in particularly Hertford. We are looking for programmers with strong commercial experience on IBM or mainframe computers. Applicants should have a good knowledge of COBOL, RPG II or ASSEMBLER, and should have spent at least 18 months in a programming environment. The positions offer scope for advancement within an area of Data Processing which is by far the most progressive in the industry. The top range salary quoted is what you can and should expect if you're good enough. What's more, it's what our client will pay. If you think that you are ready for a change for the better, then call now for further details.

CENTRAL LONDON & OVERSEAS TRAVEL

CONSULTANTS

SALARY TO £11,000
Our clients, a major consultancy, are looking for individuals with commercial acumen who can move into a company and decide what is needed. Ideally, aged between 28 and 32, you should have a good technical ability in your own discipline and the ability to develop your own general business skills. You will probably have reached a peak in the D.P. business and be ready to trade specific technical skills for general business skills. Overseas travel is involved from time to time. If you are interested in reaching the top contact us now, quoting reference GL 150.

PROGRAMMERS

SOFTWARE HOUSE c. £8000
Our clients, a major and dynamic software house, are seeking to recruit Cobol programmers for a team in the City. You will have two years' meaningful experience, and be keen to move into a Real Time, minicomputer environment using Image data-base software. Conditions of employment are excellent, and include a top salary, profit-sharing and travelling expenses.

FORTRAN OR ASSEMBLER PROGRAMMERS

SURREY **SALARY TO £8300**
An expanding software house, situated near the Sussex border, are looking for programmers to work on commercial/business systems using mini computers. Ideally, you will have a minimum of one year's experience of these types of applications, and if you don't have Fortran, COBOL, PL/I, MUMPS or Coral is also acceptable. In addition, the company is looking for an Assembler programmer with one year's experience on mini computers to work on a multi-processor system with communications and database. Experience on this sort of work will be well rewarded.

TRAINEES

HORSHAM, SUSSEX **SALARY £2,500**
If you have A levels and want to get into programming, then this company is the place for you. You will receive training and will eventually write a test program for the company. Then, if you pass, and most people do, you become a programmer in a competent professional team and work in superb modern offices. You will also qualify for such benefits as cheap insurance and a mortgage subsidy. Ideally, you will live within travelling distance of the offices already, as relocation is sometimes a problem.

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1978 looks like being a boom year for the British computer industry. The opportunities for the senior computer technician are once again increasing and it is again possible to pursue a computing career without the time-honoured move into management necessarily coming into question. Not that there is anything wrong with management: it is merely that the men and women we want, just at the moment, are those who will prefer to go on working as technicians, at least for a while, and we in Zeus-Hermes always regard this as a perfectly viable career pattern.

We are now looking for systems programmers at a senior level who started in software or technical applications programming about 1967-72 (or whose competence allows them to pass as such) and who want to stay in it without being pushed into management and without suffering in any way for this preference.

Salaries up to £7,500

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Data Search

MIDLAND RECRUITMENT FEATURE

Advertisers are reminded that on June 22 Computer Weekly is highlighting career opportunities in the Midlands with a recruitment feature.

To secure space in this important feature:

Contact Alan Escott 021-356 4838
or John Farrar 01-261 8098

Copy deadline: 4 p.m., Friday, June 16

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Computer Personnel Consultants

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Our client is a well-known manufacturing organisation with offices in London, convenient for commuting from North East and South East London, Essex or North Kent.

The installation houses an IBM 370/138 under DOS/VS which supports a teleprocessing network using SHADOW. There are on-line, real-time and database systems in operation and further development utilising these techniques is planned.

We are now seeking an experienced DP professional who has the ability to manage, motivate and train the staff under their direction.

Suitable candidates will have a programming background together with some knowledge of IBM hardware; it is likely that they will have used one high and one low level language. The most important quality is the ability to manage, and technical training will be available as required. In addition to a competitive salary, the position carries an attractive benefits package. Generous relocation expenses are available where applicable.

24-hr. answering service
Please telephone for a confidential discussion or write to:
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The world's largest international airfreight forwarder requires two experienced COBOL programmers to help install minis at its European locations. Based in Strasbourg-Thames, the work will involve extensive travelling, up to 50% of the time will be spent in Europe, during which time generous overseas expenses will be paid.

Direct experience on minis is not essential as specific training will be given. More important is self-reliance and initiative to successfully work and liaise with our European user departments. The successful applicant will be in a strong position to be closely involved with an expanding department, moving towards extensive communications and distributed processing facilities.

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or telephone Staines (08327) 85112/2, Giffordford (0443) 71507 (evenings)

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or 01-423 1534



Wellcome

Data Controller / Programmer

To join the Scientific Computing Section of The Wellcome Research Laboratories, Berkhamstead, initially the successful candidate will assume responsibility for the day-to-day input and processing operations of the Laboratories' Screening Co-ordination Unit (SCU).

On-line and batch computer systems are being developed to satisfy the data and text storage, retrieval and processing requirements of the SCU and the person appointed will also be responsible for programming and other local support to graduate staff in the design and development of such systems. Involvement later in other areas of scientific computing is planned.

The position offers this opportunity for a young man or woman, preferably with HNC qualifications in computer studies, to gain experience of all levels of project involvement. Knowledge of COBOL and FORTRAN on IBM 370 series computers would be an advantage.

The Laboratories are part of the Wellcome Group Research and Development and are concerned with veterinary pharmaceuticals and control of insect pests. They are situated on the outskirts of Berkhamstead, a pleasant country town with good road and rail access to London.

We offer an attractive salary and first-class benefits include generous assistance with relocation expenses, where appropriate.

If you are interested, please write or telephone for an application form, quoting reference LAC 21, to A. J. Morris, Site Personnel Officer, The Wellcome Foundation Limited, Ravens Lane, Berkhamstead, Herts. Tel. Berkhamstead 4334, ext. 383.

FOOD FOR THOUGHT?

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PROGRAMMERS
Several Programmers and Senior Programmers are required with upwards of 18 months COBOL experience, gained on any mainframe.

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Everything from apricots to zucchini is grown and canned by Del Monte Foods Limited in a world-wide operation. In addition, they have involvement with seafood, fresh fruit, snacks and speciality foods, consultancy and transport services. All of which contributed to last year's turnover of \$1500 million, making Del Monte a major force in the food industry. These appointments occur at the UK/European Systems Department based at Feltham, Middlesex, where a Univac 90/30 is presently utilised. All positions offer the widest possible scope for an individual to develop his or her talents. The work will be interesting with a high level of job satisfaction being achieved.

For further information, including data sheets on the company and its computer development, contact our CROYDON office quoting CW18-8S

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I have recently taken over as Managing Consultant in the London Office of Combyte Services Ltd. These are just a small sample of the many vacancies that we have on file here so. whatever your requirements, call me, Marilyn Davidson, to discuss your future.



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Applications are invited for the above positions within our Management Services Department.

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Our present installation comprises a 1.8 mb 370/146, a 2.0 mb 370/148 and a 0.5 mb Honeywell operating on a 3 x 8-hour shift/5-day week basis. We undertake a wide variety of both batch and on-line applications and currently have about 150 remote VDUs installed throughout the Region.

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SEARS

M_s A CHALLENGE FOR SYSTEMS SUPPORT PROGRAMMERS AND CONSULTANTS

MDS is a leading computer manufacturer with subsidiaries and distributors throughout the world.

The Company requires the following specialists for its UK subsidiary:

Data Communications Specialists
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Data Communication Specialist candidates should have at least three years experience in Data Communications. They should be able to demonstrate a working knowledge of the following:

- * Functions of main frame communications software
- * Terminal emulators
- * Post Office facilities
- * Modems

Software Support Specialist candidates should have a good knowledge of high level language programming preferably on minis - two to three years experience essential.

MDS provides interesting and challenging work with many opportunities for travel. In some cases, assignments abroad.

Salaries will be according to experience and qualifications - up to £7,000 per annum, plus generous fringe benefits that you might expect from a successful International Company.

Send brief resume to the
Personnel Officer
MDS Data Processing Ltd.,
50 Vauxhall Bridge Road,
London SW1V 2RT
or ring the Systems Support Manager on
01-828 1288 for further details.

Make M_s your intelligent choice.

GUILDFORD

OPERATORS/COBOL PROGRAMMERS

required by established Independent Service Bureau.

The company provides a wide range of package and commercial systems for clients throughout southern England.

The company is currently upgrading to Burroughs 81800 service hardware and wishes to recruit Operators and Cobol Programmers with 2 years' experience preferably gained on Burroughs medium system of 81700/1800 computers. The company offers a good working environment and attractive salary geared to experience.

Telephone or write giving full details to:
Richard Farnham, Operations Manager
Incomputer Ltd.
Robinson Road, Guildford, Surrey.
Tel: 0443 18212

THAMES POLYTECHNIC Computer Centre COMPUTER OPERATOR

Applications are invited for the post of Computer Operator from persons with at least five GCE 'O' level passes, or equivalent. Some knowledge of computer operations would be an advantage but training will be given to a suitable person. Commencing salary up to £3,720 per annum, inclusive 'Salary award' under review.

Details and application form (to be returned by 13th June 1978) from the Staffing Officer, Thames Polytechnic, Watlington Street, London SE18 4PP (01-854 2030 Ext. 433).

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SOUTH YORKSHIRE COUNTY COUNCIL DEPARTMENT OF ENGINEERING Engineering Analyst/ Programmer

Post Ref: E2114
Grade AP4/B. Salary £3881-£4616 (Inclusive of Supplements)

A vacancy exists in the Computer Section of the Department of Engineering based at County Hall, Barnsley for an Analyst/Programmer on Engineering Applications. The work involves developing new programmes and adapting existing ones for the engineering activities of the Department which includes highway design and maintenance, structural engineering, traffic, transportation and engineering management. The Section operates a variety of keyboard and batch terminals to the County's 192K ICL 1904S and other computers and also runs a stand alone graphics system. Analyst programmers are in regular contact with potential and existing users of their programs. Applicants should be suitably experienced and qualified by an appropriate degree or HND. Please write or telephone for an application form quoting the appropriate post reference to the Chief Executive (Personnel), South Yorkshire County Council, County Hall, Barnsley S70 2TN, or telephone Barnsley 88141 Ext. 288. Closing date for applications 19th June 1978.

**South Yorkshire
County Council**
ENERGY IN ACTION



SECTION ENGINEER (COMPUTER)

£5,389-£5,950

Guildford

For the Surrey Sub Unit of our County Engineer's South Eastern Road Construction Unit. Applicants should preferably be qualified Civil Engineers with Computers. Operating experience to manage a small section controlling a batch terminal.

This is a temporary appointment for the duration of our motorway contracts (initially for a period of two years).

Application form from County Engineer (Post No. 116), Highway House, 21 Chesington Road, West Ewell, Surrey. Tel: 01-284 1788. Ext. 215. Closing date: 24 June.



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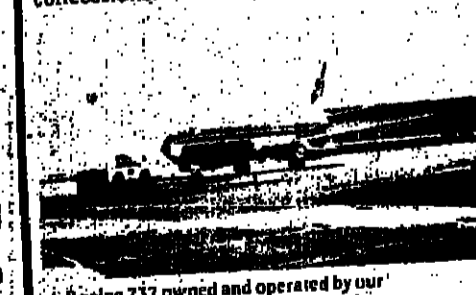
We also have our own nationwide network of retail travel agencies - Lunn Poly Limited



Last year Thomson Holidays were responsible for the holiday arrangements of over 800,000 people

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Job no 151A

Europe's biggest microfilm show comes to Wembley

THE biggest European exhibition of microfilm equipment, systems and services, Microforum Europe 78, takes place at the Wembley Conference Centre next week — from June 13 to 16 — and, as in previous years, there should be plenty to interest computer users.

Most major suppliers of computer output microfilm recorders will be there, and several leading UK COM bureaux are taking stands to talk about their services. An extremely wide variety of microfilm and microfiche readers and reader/printers will also be on show.

Organised by the Business Equipment Trade Association, Microforum 78 will also include a one-day programme of seminars entitled "An Introduction to Microfilm." This will be held on June 13, and repeated on June 14 and 15, but not on June 16.

The morning group of seminars on each day, called Unit 1, is being aimed at the potential microfilm user and will cover subjects such as 16 mm roll film systems, duplication and how to choose a suitable format for microfilmed pages of information.

The afternoon session, Unit 2, is designed to augment Unit 1, and should be of interest to existing as well as potential users. Subjects will include computer output microfilm, methods of coding 16 mm film, jacket systems and aperture cards.

All presentations will be by representatives of firms in the business, including Kodak, Bell and Howell, NCR and 3M and the fee is £18.44 for each unit and £34.58 for both.

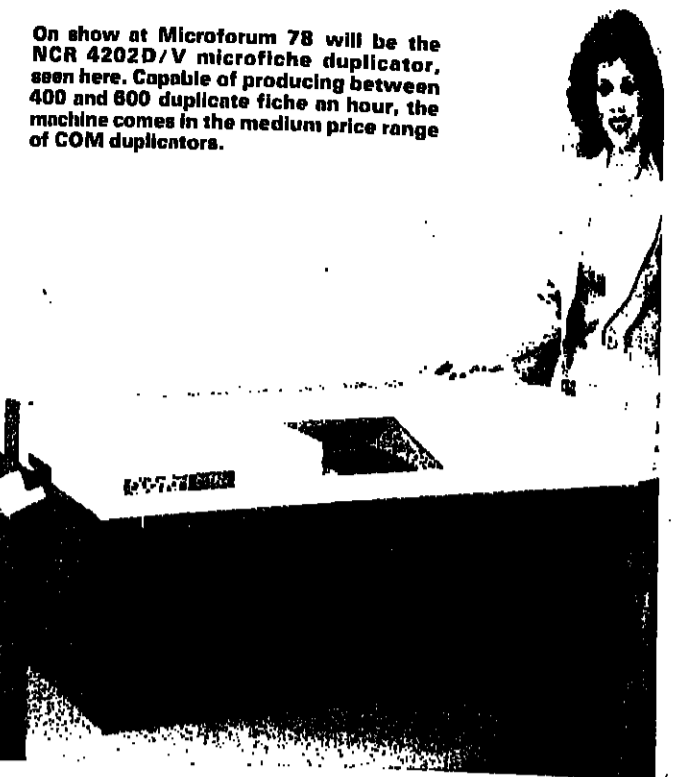
The exhibition has a 22 entrance fee and one of the more interesting demonstrations should be the live generation of microfiche by an NCR 643/115 COM recorder on the NCR stand. This has been done before by NCR at previous shows, but the big difference this year is that graphics will be merged with text on each microfiche.

The optical image combiner is available as an option on all NCR COM recorders with a minicomputer controller and is intended to solve the problems of firms that have to produce parts catalogues, engineering drawings and similar graphics on microfiche with text on adjacent frames or mixed with graphics on the same frame.

A system with the graphics merge option can take over this work from slow step and repeat cameras. It accepts graphics images on batches of 35 mm slides and can advance or reverse in order to select the required slide. No physical lens changing is needed to merge a graphics image with a frame of text filmed from the CRT in the COM recorder.

The merging of graphics with alphanumeric information will also be illustrated by one of the COM bureaux appearing at the show, Microgen, which will explain how using COM for this job can speed up the updating of records and remove the risk of out of date records being used. Microgen will also discuss its ability to produce COM output from data tapes, as opposed to specially formatted COM tapes.

Graphics and drawings can also both be produced by the 3M Betacom 700H COM recorder operated by the RHM Centre



On show at Microforum 78 will be the NCR 4202D/V microfiche duplicator, seen here. Capable of producing between 400 and 800 duplicate fiche an hour, the machine comes in the medium price range of COM duplicators.

COM bureau which will be at Microforum to discuss some of the advantages of its services. These include the COM software development facilities that it can offer on the IBM 370/158 run by RHM Management Services.

Another COM bureau, UCSL Datacom, part of Unilever Computer Services, will be talking about a new micropublishing service and will also be displaying a range of indexing and retrieval systems to help users make best use of microfilm after it has been generated.

Innovation at Microforum will be a system that can update individual frames on a microfiche. Called the A. B. Dick/Scott System 200 it can add new frames of information to a fiche at random intervals over a period in excess of 25 years and takes only eight seconds to expose, develop and fix each new frame.

The system's manufacturer, A. B. Dick, says it can be operated as easily as an office copier and offers the user a true microfilm analogue of a paper filing system, with documents being annotated or cancelled as in a paper file.

Racal-Redac makes challenge in the CAD system market

MAKING a concerted effort to gain major inroads into the European market for computer-aided design systems, Racal-Redac spent last week in the Okura Hotel, Amsterdam, with an exhibition for potential European customers.

It also took the opportunity to preview two new systems that it intends to add to its product roster.

The first of these is a system for electronic circuit analysis, aimed at providing designers with the facility to construct, manipulate and test circuits before any commitment to hardware development. This allows designers the opportunity to evaluate several different hardware approaches to a particular problem, before settling on a solution.

The second system is for mechanical design, and is intended to provide a means of visualisation of mechanical design concepts. Initially, the system is planned for use on mechanical parts, as might be found in the chassis of electronic equipment, but Redac has plans to extend the system to cover three-dimensional operations.

Both new systems are based on Digital Equipment PDP-11 hardware. Redac now having standardised on this manufacturer's products.

They joined the company's existing product range in the show, which had versions of the Redac Executive, the integrated circuit design system, the Mini printed circuit board system and its new big brother, the Maxi. This is essentially the same as the Mini PCB system, having a bigger graphics display capability offering higher circuit throughput.

UK telephone bills fall below the average, claims Logica

TELEPHONE bills in the UK are about six per cent below the average for Western Europe, according to an index produced by Logica from information gathered for its Tariffica service.

The index provides only a very simplified basis for comparing one country with another and one year with a previous year. A more sophisticated index may be produced in the future, Logica says, if there is a demand for it.

Tariffica has been used to provide details of European telephone services, regulations and costs for over a year and the client list includes PTTs as well as such organisations as Lloyds Bank, Esso, Nippon T&T and Reuters. Logica will use the data to compile the next Eurodata survey (CW, March 9).

Now into its third edition, Tariffica is available as a looseleaf book of 325 pages, updated several times a year, at £440. Logica offers a Tariffica Club Service which costs £1,760 to join plus £770 a year. This includes two copies of the survey plus updates, inquiry and news bulletin services and low-price extra copies and special editions.

Andahl installations

THE US House of Representatives has installed two Andahl 470V/75 mainframes on lease for four years, to supplement its information system.

New Kienzle offices

NEW offices in Manchester have been opened by Kienzle Data Systems at Circle House, Victoria Road, Chorlton.

Computer Marketing

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Meeting the needs of the banks

By **MICHAEL EDWARDS**

Computer manufacturers and the major banks have often developed their own strategies in relation to the latest technological developments, says Michael Edwards, who is executive manager, marketing, of Gamma Associates' Financial Systems Division. It is with some relief that he now notes a coming together of banks with manufacturers to discuss future systems development. But he adds, "We are still a long way from any rapid change."

TOO often computer manufacturers have tended to plan their products around the latest technological developments, whereas the major banks have based their systems on somewhat conservative hierarchical organisational structures. Thus the two have developed their own strategies, "bending" when necessary the technology to fit the application or the organisation.

This principle has worked to a limited extent but often at considerable cost in response time or in comparison to the usual manual methods.

It is with relief, therefore, that we can now see a coming together of banks with manufacturers in discussing future systems development. But we are still a long way from any rapid change. In the main, banks are relatively rigid institutions which cannot effect necessary organisational changes to satisfy the latest hardware developments. Nevertheless the need to stay competitive remains and development has constantly to be directed towards computerised methods.

Hundreds of thousands of transactions are performed daily, servicing millions of accounts. Payment systems vary from country to country; money transfers have to be effected rapidly and as the supply of clerical labour shrinks, the cost per transaction continues to rise.

And there are many other applications for which computer solutions will be sought. These range from paperless clearing between banks, automatic teller machines, touch tone and viewdata, message switching, point-of-sale terminals and word processing.

Paperless clearing between banks is particularly interesting and there are likely to be significant developments, especially between countries.

Many 'automatic teller machines are already in use in individual banks, but banks will consent to install joint ATM networks.

In the area of touch tone and viewdata, banking from home has already been tried and is likely to continue. Message switching is already widely used by many banks, particularly those operating internationally.

Now we come to point-of-sale terminals. The Interbank Research group in the UK is already fairly advanced in the functions required to provide direct debiting in retail outlets. POS is not technically difficult, but it still needs public acceptance.

In word processing, secretarial work is increasingly being automated. Considerable information is held on data processing databases, and simple, user-designed terminals which access those databases provide not only internal efficiency but offer an electronic mail alternative to hard copy mail.

Although there can be a coming together of the institutions and the manufacturers, there still remains the bridging of the gap between the individual user and the in-house technologist. In this respect there are two main considerations. The systems have to be more user oriented and the user should be "protected" from the operating environment.

Clearly a new approach is needed if the continuing growth of paper recording is to be contained.

Designing a banking system raises the argument between reliability and availability. Manufacturers talk of reliability being 90 to 95% based over a 12-month period, but that could be achieved with a total computer "black-out" for three days. What is important to a bank is availability. Not only must the hardware be "off the air" for a minimum of time, but also when repair has been effected, recovery should be simple and speedy.

Much time and effort has been exercised in tuning a system to increase availability, only to be thwarted by the next version of operating system or central processor being incompatible. Software should be transportable, particularly as the cost of hardware continues to decline and software costs therefore take on a larger percentage of the overall system cost.

As hardware costs decline, so also does the overall share of the system provided by the vendor. This supposes that the involvement of the manufacturer moves still further away from the application and the integral responsibility for the reliable operation will rest still more on the bank's management. Use of standard hardware and software from the manufacturer wherever possible becomes imperative.

How, then, can a bank provide all the latest tools to its users to facilitate their function without steeping them in the day-to-day terminology of computers?

It is quite clear that future banking services will still require databases to be maintained at one central site, but the information contained at the site will require easy, timely access by a user at a remote terminal. Twenty-four-hour-a-day, seven days-a-week operation demands, together with a reducing number of working hours will push a bank to real time computer operation more quickly than it would like, and the complexity of transactions handled by the system will increase.

And what of security? Large batch machines will not answer all the requirements for the future and minicomputer manufacturers like DEC have made great inroads into the real time banking world. Front-ending to back office machines with online applications like foreign exchange, funds transfer, security accounting, Eurobonds, etc. the mini provides a more adjustable machine to mechanise remote branch applications.

In essence then I am saying that banks require computer manufacturers to provide systems that are transaction oriented; provide availability and reliability; security and privacy; compatibility; database and file management systems; network ability; recording and restart facilities; maintainability; and user oriented.

It would seem that only DEC has gone very far to provide just the sort of requirements listed above. The recently announced TRAX (CW, June 1) is a complete operating environment de-

signed for online transaction processing. Application programs written on one TRAX system can be run unchanged on another. It is a high performance system with multidrop block mode terminals, powerful recovery system capability, communications functionality, high level language compiler and a forms language to support fast and inexpensive program development.

From the security standpoint, users cannot access the operating system. The terminal is entirely transaction driven and guards against unauthor-

ised activity with user sign on, passwords and identity codes. It also has user and terminal work classes that define what transactions are available to a user of a terminal. TRAX utilities log hardware and software errors to help provide increased up-time.

Banks without technical resources will become increasingly dependent on specialist systems and software houses to provide the technical and managerial skills for applications engineering. In this capacity the large OEM can influence the manufacturer in future product strategy giving added weight to the requests and needs of the banks.

The large European banks which the manufacturers tend to treat as being the same as the US banks in terms of data processing — which they are not — generate their own needs based on the large mainframe approach. Nevertheless, since they too are looking to distribute processing, albeit across a greater number of smaller machines centrally located, the requirements will be comparable to those of smaller banks.

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How to avoid chaos when your data network crashes

By Ray Northcott

SOME months ago, on the way back from a business trip, I arrived at the airport at the time designated for check-in.

Reaching the head of a long queue, I handed my ticket to the girl on the counter and watched appreciatively as she keyed the information in with a confident smile.

Suddenly her smile wavered and finally disappeared altogether as her terminal refused to respond.

There then followed a period of some 20-30 minutes total chaos. Airline staff rushed about in confusion and talked in agitated whispers down the telephone while the equilibrium of my fellow passengers began visibly to disintegrate.

When, after some heated conversation, a man who appeared to be in authority, came along and tried to implement the stand-by manual system, several of the girls admitted that they had never used it before and the ensuing education programme contributed to the problem by wasting more valuable time.

The story of this frenetic morning's disruption serves to illustrate the need for proper management and control of data networks.

In this case, the users of the system should have been properly briefed on their role in the case of such an emergency and consequently better able to cope with authority and calm.

During the past few years, the growth in terminal population in the UK has been phenomenal. The forecast figures, produced last year by Pactal for the Eurodata Study, predict that by 1985 we shall have 400,000 terminals installed and these figures are accepted to be on the conservative side.

If the recent swing to distributed computing and the success of the minicomputer are taken into account, it is easy to see that data networks are increasing both in their numbers and in their complexity.

The majority of small and medium-sized organisations, particularly those that operate a simple star-configured network,

"If the recent swing to distributed computing and the success of the mini are taken into account, it is easy to see that data networks are increasing both in their numbers and in their complexity."

minimise the number of suppliers involved to two — the computer supplier for the mainframe and terminals and the Post Office for leased lines and modems.

However, the constraints and possible cost disadvantages that single supplier solution can impose may dictate a more adventurous approach to achieve a cost-effective network.

This could mean the introduction of terminals from third suppliers, or the in-house software products for data networks provided by the

minicomputer suppliers which can be interfaced to other manufacturers' mainframes.

The operator of a more complicated network may look to the specialist suppliers in the data communications field who can provide the equipment which will maximise line utilisation and network efficiency such as multiplexers and concentrators.

In any event, the Post Office will always be involved, except in the case of an organisation like British Rail, which has its own independent telecommunications network.

In order for any network to function effectively, special techniques and skills are required to maintain it, and although these may vary with the size and complexity of the network concerned they must be incorporated into the overall DP planning if disruption is to be avoided.

First, the network should be secure against equipment or line failure. This means that sensitive areas of the system should be identified and the consequences of failures occurring in these areas assessed.

Sensitivity can range from the need to provide duplicate lines and equipment which can be introduced immediately any failure occurs by means of remote and/or local switching facilities, down to failures which can adequately be covered by a return to manual working for a limited period, known colloquially as Bottoms — back on to the old manual system.

The second feature which is crucial to the smooth operation of a data network is the implementation of reliable diagnostic techniques which will facilitate rapid isolation of faults. Of course, responsibility for repairing faults will depend upon maintenance contracts negotiated with suppliers or, in some cases, it will fall upon staff employed by the user organisation.

However, it need hardly be said that if faults can be pinpointed swiftly, correcting them becomes a far simpler and cheaper task for whoever has to do it.

Diagnostic techniques sometimes employed can include the use of special test equipment to investigate signal amplitude, signal distortion and noise of both impulsive or continuous nature.

In addition, remote switching capability allows loopbacks and the isolation of suspect parts of the network. This switching capability can then automatically produce stand-by equipment in the off-standby area.

In some cases, operators of networks employ specially designed software which provides listening capabilities and means of allowing remote, non-technical staff to carry out some initial investigation and identification of faults on terminals and modems.

Once the system is as secure as it needs to be against breakdown and effective methods exist for finding faults should they occur, it is advisable to establish a programme for

monitoring the status of the components of the complete network.

Up-to-date knowledge of the condition of the lines, modems, terminals and other devices may well allow maintenance to be effected before a fault becomes visible to users.

This monitoring programme will also ensure that standby equipment or lines are operational.

What happens when the lights go out is a recurring theme for script writers. But for network users the answer could well be chaos.

Ray Northcott, a consultant with Pactal, argues the need for proper management and control of data networks. And the springboard for this should be the appointment of network controllers.

Northcott was previously with British Rail where he was involved in the implementation of the Tops project as well as its national telecommunications plan.



Northcott

nal, since it is not unusual to find that faults occur in the standby facilities themselves and have not been detected due to lack of use.

Anyone who has confidently switched on to standby equipment only to find that this too is out of order, knows of the embarrassment it can cause.

Faults can occur in data networks for a number of reasons, some of which will only become apparent through the keeping of fault records and the compilation of statistics from these records.

So part of the network control programme would be the collection of statistics relating to faults.

After keeping statistics for some time, it may be possible to find that high failure rate is due to environmental shortcomings of temperature or humidity or even misuse of the equipment by an individual user.

Alternatively, the fault may lie with the equipment itself and, with statistical evidence available, users are more likely to obtain meaningful response from the supplier.

Part of the overall network control programme should also include procedures for commissioning new terminals. Experience indicates that a user organisation should accept equipment according to procedures and tests specially suited to its system requirements.

Such tests should be agreed between user and supplier, and should be under the overall control of a member of staff who will accept a terminal into the network or reject it on the basis of the results of these agreed tests.

It is important when considering this aspect of network control, to remember that an online terminal is being intro-

duced to employees who may well view such a device with scepticism if not actual hostility.

Chaos in the early stages of online working, resulting from superficial or poorly thought-out commissioning procedures, will undoubtedly erode the credibility of the network. Such credibility can be hard to gain, and almost impossible to establish if initial performance is

concentrating merely on data aspects.

Some of the questions that might require careful consideration are:

1. What is the total telecommunications traffic between two points on the network likely to amount to at the time of commissioning and in the foreseeable future (data, speech, facsimile etc);

2. What is traffic distribution across these sectors likely to be;

3. What level of service is acceptable for each of the various facilities; and

4. At what speed will data be transmitted?

In practice, it is often preferable to develop the data network and achieve satisfactory operation and control and then turn attention to rationalisation of the total telecommunications facilities required by an organisation by first gathering comprehensive traffic statistics.

Such investigations may reveal worthwhile opportunities for simultaneous speech and data transmission on one leased circuit, or perhaps the use of this facility for speech during the day and data or facsimile outside normal office hours.

As I saw first-hand at the airport, a failure which might stay as a mere inconvenience can become a major disruption if the users of the network are not provided with adequate support.

The girls at the desk had no idea of what had gone wrong and whether it was being attended to or how long it would be before the system would be restored.

In addition, they were completely unprepared for implementing the standby system.

Thus it is vital to ensure that all users of the network are provided with adequate documentation on what action they should take to reduce the effect of faults.

Responsibility for the programme mentioned above

necessitates that any organisation operating a network should appoint a network controller.

Of course, where the network is small in size and simple in structure, this job can effectively be carried out by a member of the DP department on a part-time basis, but for a large and complex network, a specialist should be employed.

"Ideally, the network controller should have a thorough knowledge of data communications and a good appreciation of telecommunications in general."

Ideally, the network controller should have a thorough knowledge of data communications and a good appreciation of telecommunications in general, and software in the areas of telecommunications, diagnostics and statistics.

Strong technical background and management capabilities are also essential if effective liaison with the Post Office, equipment suppliers and users is to be established and he or she should be aware of opportunities for improving the network afforded by business and technological developments.

Clearly, such an individual will not be easy to find and it may be necessary to supplement experience with selective training.

Finally, it is worth stating that network management and control can be as simple or sophisticated as business requirements and network complexity dictate.

However, it should not be considered as a subject of interest only to organisations with large networks as there are worthwhile benefits to be derived from establishing sound procedures even in the smallest network.

Hanging helplessly on to an unresponsive telephone is one of life's most frustrating and frequent experiences these days, writes Laura Tatham. The conventional telephone equipment, however, is incapable of optimising the distribution of incoming calls among a group of extensions and a more sophisticated computer-controlled system is effective,

but too expensive for most firms. Here, the author describes a new minicomputer-controlled system called ACD 5000, designed and manufactured by the Norwegian telecommunications company, Gustav A. Ring, which can prove cost-effective for as few as five operators and as many as 200 working between 10 and 160 lines.

System that streamlines distribution of incoming calls

By Laura Tatham

HANGING helplessly on to an unresponsive telephone is one of life's most frustrating — and frequent — experiences these days. In theory, one should ring off and start again rather than wait a connection which, for some unknown reason, has not been made. In practice, especially when the call is handled by a busy switchboard, it is so difficult to get through again that to hold on seems the lesser of two evils.

The flow of adrenalin triggered in such circumstances bodes ill for the luckless person who eventually takes the call. This is particularly unfortunate when the object is to place an order, since efficiency in this area often gives a company a competitive edge. The telephone bottleneck also seems peculiarly absurd when the order recording process itself has been streamlined by the use of online terminals.

Conventional telephone equipment, however, provides no answer to the problem, for it is incapable of optimising the distribution of calls among a group of extensions. More sophisticated computer-controlled systems are effective, but too expensive for any but the largest organisations. A new

minicomputer-controlled system called ACD 5000 offers, for the first time, a solution for the small user. Designed and manufactured by the Norwegian telecommunications company, Gustav A. Ring (whose Ringmaster intercom equipment is well known in the UK), it can prove cost-effective for as few as five operators but can also accommodate up to 200 working on between 10 and 160 lines, the company claims.

"During unavoidable waits, callers are reassured by recorded music or messages and the operators find their job a lot less stressful."

This contention is certainly supported by the experience of Aftenposten. One of Norway's best-read newspapers, which is published morning and evening six days a week, it derives an annual revenue equivalent to \$30 million from its classified ads. These, which on a busy day may number up to 1,700 and emanate from quite a wide geographical area, are almost all dictated over the telephone. A

total staff of 68 operators in the Classified Department works in shifts from 7 am to 9 pm on weekdays and for three hours on Sunday evenings.

Until recently, it was disappointing to the supervisor, Mary Carstensen, that even her highly trained staff could not always provide first-class service. This was because incoming calls came through conventional telephone equipment which had no queue management system. A local caller might therefore be connected immediately while someone who had rung earlier on long distance was still waiting for attention. Undoubtedly, some disgruntled callers rang off after a while with consequent loss of business.

For operators, the job was nerve-frazzling. Bells jangled continually. An important part of the service is to advise customers on the wording of their ads, but while the girls were doing this they were uncomfortably aware of the constant flashing of the 24 signal lamps on their desk panels which showed that other callers were waiting.

Mary Carstensen therefore welcomed the opportunity to become the world's first user of the Ring ACD 5000 equipment.

This was ordered on her recommendation after she had satisfied herself of its potential usefulness and discussed it with her operators. Before its delivery, she also provided useful suggestions to the Ring engineers on features to be incorporated into the supervisor's and operators' panels which, with other system characteristics, can be tailored to some extent to meet the needs of individual users.

Modularity of design is a key feature of the Ring ACD 5000 system, which is offered as a complete hardware-software package, including the telephone switchgear. At its heart is a Computer Automation Naked Mini. This automatically distributes all incoming calls, giving priority to certain categories if required, continuously monitors the performance of all equipment, diagnosing and reporting on faults, can automatically interpolate pre-recorded messages after a given wait time; and collects and analyses a variety of operating statistics.

Software for the system was written jointly by Ring specialists and members of the computer department of the Trondheim (Norway) Technical University. This team optimised the original operating system to suit the requirements of the ACD 5000 and programmed all the functions outlined above. Since the system is "finite" — that is, every possible state can be pre-defined — all the programs are table-driven.

The computer memory can be expanded from the basic 16K required by the software. How many increments are added is determined mainly by how much statistical information the user wishes to collect and how often this is dumped onto a central printer under the control of a real time clock; and/or to the supervisor's panel.

The surface of the stations provided for individual operators is only about 34 by 64 inches and the equipment may be set flush into a desk, as has been done at Aftenposten, or be freestanding. Each station contains a 12-key dialling pad, four control keys and six display windows. A lid placed over the top when not in use incorporates a stud that, by pressing on a button immediately below it, automatically notifies the computer that this position is not working. A lightweight headset plugs into a jack.

An operator in the Aftenposten Classified Department demonstrated the system with evident enthusiasm. On arrival at her desk, she explained, she removed the lid from the panel and pressed a button which lit a lamp in one of the display panels

and clocked her into the system. The arrival of a call was signalled by the flashing of a display lamp and accepted by pressing another button. By doing this she notified the system she was busy and it changed the display to show the origin (line group) of the call.

A feature she specially liked was that the system would not present her with a further call until she had signalled her readiness to accept it. This allowed her to finish all the work

Bells jangled and lights flashed continually, the job was nerve frazzling for the operators as well as for the girls advising customers on the wording of their ads.

connected with the call (which might include looking up references) without being harassed. A glance at an illuminated wall panel visible to all the operators would, however, show her how many calls were queuing in the system as a whole.

Transfers of calls through the main switchboard to other parts of the building is equally simple; an incoming caller who wants to talk to a specific operator can ask whichever girl the system selects to transfer him, when he will be put through at once or wait if she is engaged at the moment.

Mary Carstensen was impressed with the amount of information the ACD 5000 system provides. Her panel, which

has a layout identical to those of the operators, plus extra display positions will show on demand how many calls are present and actually working and how many free at that particular moment.

Seventeen different types of report and analysis can be shown on demand and are also automatically printed each hour. Typical examples are: how many callers have waited up to 80 and up to 90 seconds for attention (the intervals were selected by Ms Carstensen); average time spent in talking and in post-conversation work, in total and per operator; how many calls were abandoned; the percentage of time that all lines were busy.

The last of these, used in conjunction with the figures on wait times and line utilisation, indicates if line capacity is adequate. Another report, showing the calls offered per line, reveals when a line is out of order (which goes undetected with conventional equipment).

For local callers, waiting time is always minimal, for the system distributes on a first come, first served, basis except for long-distance which automatically gets priority. During unavoidable waits, callers are reassured by recorded music or messages. Operators find their job a lot less stressful and the room in which they work is almost unenviably quiet.

The Norwegian Telecommunications Administration has approved the Ring ACD 5000 system and will shortly be using it to improve its own service to subscribers.



An engineer at the computer with the phone equipment in the background.



An operator at her station.



An operator sitting at the layout of the keypad.

Calls for papers

PAPERS in English or French are invited for an international symposium on flow control in computer networks, organised by the Institut de Recherche d'Automatique et d'Automatique et d'Automatique, to be held in Paris on February 12-14, 1978. The deadline for receipt of the paper is 15 October 1977. Further details from IRIA, Service des Relations Extérieures, Domaine de Volp, BP 105, 91890 Le Chesnay, France, tel: 094 00 20, poste 600.

A CALL for papers for the international conference Teleinformatics 78, to be held in France on May 28-30, 1978, has been issued by its organisers, AFCEP, Draft texts should be preceded by "Intention to Submit" and should arrive by September 15. Further information from the Conference Secretariat, AFCEP, 188 Boulevard Pasteur, 75017 Paris, BP 671, tel: 789 24 19/24.

CONTRIBUTIONS are invited for a conference on computer-aided design and manufacturing of electronic components, circuits and systems, organised by the Institution of Electrical Engineers and of Sussex, to be held at the University of Sussex on July 3-4, 1978. Synopses should be received at the IEE Conference Dept by October 6. Further details from IEE, 179 Queen's Office, tel: 01-248 1871, ext 224.

PAPERS are requested for the University of Liverpool's Third Annual Workshop on Microprocessor Applications, to be held at the University on September 4-5. For a list of possible subjects contact Dr Malcolm J. Taylor, Computer Laboratory, University of Liverpool, P.O. Box 147, Liverpool L69 3BX, tel: 051-709 8022, ext 2054.

ARTIFICIAL Intelligence is the theme of the AISB/GI conference to be held in Hamburg on July 18-20. The Program Committee consists of Alan Bundy (Edinburgh), Steve Hardy (Sussex), H. H. Nagel (Hamburg), Jacques Pitar (Paris), Derek Sleeman (Leeds) and Yorick Wilks (Essex). H. H. Nagel is the General Chairman at the Institut für Informatik, University of Hamburg, 2 Hamburg 13, Schulstrasse 70, West Germany, and the Program Chairman is Derek Sleeman, Dept of Computer Studies, The University, Leeds LS2 9JT, Yorks.

A TWO-DAY conference on plug-compatible machines has been organised by the British Computer Society, to be held at the Regent Centre Hotel, London, on July 19-20. For details contact the British Computer Society, 100 Strand, London WC2R 0AL, tel: 01-248 3623.

AN exhibition and conference called the National Security and Protection Exhibition will be held at the Grand Hotel, London, on June 27-28. It is sponsored by the International Professional Security Association. Further details from Ballate at Pembroke House, Campbourne Road, Hornsey, London N6, tel: 01-340 3291.

IN Copenhagen a three-day seminar entitled Minicomputers and Distributed Processing will be held at the Sheraton Hotel on June 28-30. It is organised by the International Centre for Continuing Education. For details, write to Minicomputers Seminar, Conference Associates, 24 Stanford Road, London W8 5PZ, or telephone 01-937 3163.

TWO separate seminars entitled Computers in a Production/Inventory and Purchasing Environment are being held by MSS on June 28 at Warwick and on October 6 in London. For details contact the Seminar Secretary, MSS Computer and Business Consultancy Ltd, MSS House, 48 Chapel Road, Worthing, Sussex BN11 1BJ, tel: Worthing 34765/6.

THE conference on computer-aided design, CAD 80, organised by the journal Computer-Aided Design, will be held at the Brighton Metropole on April 3-5, 1980. Those wishing to submit a paper or to be on the mailing list should contact G.H. Hawley, Conference Secretary, CAD 80, IBC Science and Technology Press, Ltd, 22 High Street, Guildford, Surrey GU1 5EW, tel: (0443) 21001.

CHRISTINE HARVEY PROVIDES AN INSIGHT INTO SOME FEMININE SUCCESS STORIES....

Christine Harvey, feature writer and advertising sales executive in the US before moving to the UK, is now herself contemplating the possibility of moving into

the software sales field. "As a result of talking to recruitment advisers, I became intrigued with the apparent minority of women in the computer industry

in this country. I decided to investigate the situation, and discovered that while their percentages may be low, one would certainly admire their success stories.

And enthusiasm for their work was striking in every way," she says. In this article, Christine provides an insight into the experiences of these women.

How women compete in the computer industry

AS women climb the ladder of success in industry, a new image of the career woman is emerging to replace the old one, which sometimes denoted a certain callousness slanted toward masculinity. No longer are women feeling that they must give up their femininity to be successful. In fact, many of the previously repressed so-called feminine traits are now thought of as being essential to success.

A Harvard Business School survey which substantiates this, examined 25 of the most successful businesswomen in the United States. Their results showed that these women dis-

played a true working balance of masculine and feminine traits. Their intuition to size up people and situations quickly, their attention to detail within the total picture, and their genuine concern for people, were all qualities which they brought to their positions in upper management.

Although women occupying senior positions in the computer field are still in the minority, many of those who have entered it have an interesting record of success.

Faye Ogilvie, director of Management and Executive Selection, has a favourite story about a woman she placed in the computer sales field several years ago. "This woman was so successful that her company hired a chauffeur-driven car for her to see her clients," she explained.

In another case, Faye had placed a woman with a company and after three years the boss called her with a plea: "Can you help me fill her spot with another woman? She's moving abroad with her husband, and she's done such a tremendous job, I don't think her clients will accept a man in her place. I want to fill it with another woman."

Faye feels that women, often have the edge over men in sales. Firstly, they get their foot in the door more easily, simply because of their uniqueness in the field. The next step is convincing the client of their technical competence — and the rest is smooth sailing.

Of all the fields in the computer world, selling seems to be the one least penetrated by women. Kay Law, the first woman in sales in the Page Printing Systems Division at Honeywell, feels that there is a myth still circulating about the sales field. "If more people understood the true scope, I'm sure more would get into selling," she says. "It requires much the same skills and competence as other aspects of computing."

While she agrees that being a woman opens doors to her, she points out that this can sometimes be a hindrance. "While my colleagues accuse me of having prejudice working in my favour, I argue that it also creates a time-wasting factor. Because women in this field are such a rarity, men sometimes make appointments just to see

what a saleswoman is like, with no intention of buying."

For the most part, she finds sales very rewarding. Getting to know a lot about a large number of organisations and being able to analyse their problems makes the job highly enjoyable for her. "There is intrinsic delight in selling," she says. "There's tremendous satisfaction in building up the business every step of the way, then going to see the equipment in use and of benefit to the customer. Success in selling is largely due to the building up of the customer's confidence in you."

All the women interviewed felt that being a woman was a definite advantage in their field. They preferred, however, to think of themselves simply as a person doing a job well. They all implied that they were not "women's libbers".

Sonya Howell Jones believes so strongly that it's an asset to be a woman in today's competitive world that she says, "If you have sound reasoning and good judgment, you can use your charm as the final straw."

She objects to the prevalent connotation of the term "career woman". While her career is important to her, she would not work in a field that she did not find rewarding. In her present position as manager of marketing communications at Data General, she finds satisfaction in the diversity of her responsibilities. "It's an industry that's fun to be in and it stretches one to the maximum."

With the pressure of deadlines, and activities leading up to trade shows, time is always in short supply. There are constantly issues which must be addressed. "You are ultimately forced to get your own answers after weighing up the alternatives. These answers may come to you in the middle of the night or after many days of concentrated planning."

As regards being a woman in today's marketplace, her philosophy is, "If you have the required background and ability, you should fight for a place for yourself."

While being interviewed, most of the women expressed the view that women had a highly developed understanding of people that helped them in problem solving situations.

Marian Carney, DP manager at Richard Costain, the construction group, feels that this is an advantage in her position, working closely with people and shuffling on this perception daily when facing people across the desk. She finds that judging personalities is an integral part of resolving problems.

When asked how her male counterparts reacted to her initial promotion into management, Marian reflected that she was senior to the others in her group, so when the promotion came nobody protested. "The only abnormality was that everyone who would be working for her was asked if they minded working for a woman. But she could not recall ever being consulted on her reservations as a new manager in her department."

"Even my secretary, who joined us two years ago, was asked by personnel if she objected to working for a woman." Later, she told Marian that she thought it was a ridiculous question. Regarding the shortage of

programmers, Marian feels that employers must rethink their hiring policies. "Many are still afraid that women will quit to have a family, but the risks are just as great as a trainee will quit to move on to a better paying job." To resolve this problem she thinks that they must take the necessary risks of

hiring both young people just out of college, and women.

"Women," she says, "have an eye for detail which makes them particularly good in the programming field."

The others interviewed felt that women in general had a keen eye for detail, which does not make them lose sight of the overall picture.

Christine Stott, sales promotion manager for Case, went so far as to say, "I suppose I'm a chauvinist in reverse. It's not that I would mind having a man work for me, but I haven't interviewed one that I felt was as attuned to detail as most women are trained to be. I just don't

have the time to pick up the pieces for them. Also, one is very conscious of the fact that men have constraints towards working for a woman which is a source of concern."

She feels that we still have the problem mentally of putting female executives in the wrong role. "In a new group situation, it's assumed that I'm the secretary."

She also feels that women could use their talents to make an impact in the computer field, and be very successful in it. "I find it very disappointing that many women are in secretarial positions who could be using their potential to

a far greater capacity. "There are disadvantages that must be overcome in this business. First, it takes women longer to establish credibility. Second, they must always be prepared to walk the tightrope between femininity and professionalism. Also, they must take the same attitude towards work as men do, including working late and taking business luncheons for granted," Christine commented.

As men and women both move towards the middle line of total person, or what psychologists now call an androgynous personality, we should be able to anticipate a more productive and compatible working environment.

Christine started her career with a scientific background in biochemistry, with her first position as a technical officer at the Chemical Warfare Establishment at Porton Down. She moved to the Lister Institute, and then on to a recruiting position with a scientific personnel agency, where she developed an interest in computer placement.

After her marriage she took a three-year break in her career. "When I tried to return to the industry, the recruitment people treated me as though I had been dead for that length of time."

She found this disturbing, but persisted in her job search and found that once she had got past the recruiter and into the actual job interview, the situation improved.

She was offered a position as a call dispatcher in the field engineering department at Case which mainly involved dealing with customer problems. This insight into the company, its customers and its engineers, led the way into sales promotion. Now heading the department, reporting to the managing director, she has a personal

assistant, and a secretary to help her with a diverse range of promotional activities. These include preparation of both technical and sales literature, Press interviews, exhibitions and a company newsletter.

In a position with as much diversity as sales promotion, it is difficult to select one function as more important than another. Success in promoting the right image for the company is one of the main sources of satisfaction for Christine. One can see evidence of this from a successful exhibition.

Feedback from seminars, held about once a month, is another measure she relies on.

The biggest problem she sees in her side of the industry is in educating the marketplace. To do this successfully, she feels one must try to avoid using technical terminology wherever possible. Knowing where to strike a happy medium is the difficulty.

The important thing, she says, is that the customers "need to be made aware of what they could be doing rather than what they are doing."



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CASE STUDY-1

Steer clear of technical jargon

FOR Christine Stott, sales promotion manager at communications systems supplier Case, total involvement is the name of the game. She points out that women must take a different attitude toward their career if they expect to be promoted. This includes long hours when necessary, and lunchtime dedication to the business. "In other words," she says, "they must take the same attitude as men do if they expect the same rewards."

CHRISTINE STOTT... "I suppose I am a chauvinist in reverse."



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CASE STUDY-2

Job satisfaction top of the list

MARIAN CARNEY, DP manager at Richard Costain, started her computer career when, after "A" levels, she was recruited by ICL (then ICT) as a trainee programmer. She has always been well received by prospective employers, and does not feel that there has been any prejudice towards her as a woman.

After two years with ICL, she moved to BICC as a programmer, was promoted to senior programmer, then moved to Costain, as a systems analyst and design trainee. She has spent the last nine-and-a-half years there, the most recent two-and-a-half years in management.

Initially she had no aspirations towards management. "I am the type of person who likes to do a job well, and I'm flexible about accepting different responsibilities as they come along."

When considering all aspects of her career, Marian places job satisfaction at the top of the list. She finds close-knit team efforts the most rewarding.

One example of this dates back to when she was a project leader. She recalls the team spirit that existed in the weeks just before an accounting system went live, with programmers and accountants checking the results. The sense of accomplishment that everyone felt was tremendous. There is also satisfaction for her in knowing that the system is still operating successfully now, six years later.

From a management point of view, Marian says that she likes her people to be technically competent. "If I pick up a pro-

gram that is written particularly well, I get a sense of satisfaction out of knowing, I suppose, that I am partially responsible, especially if that person has been with me a number of years and is performing well."

The key to success in a project, she firmly feels, is being able to rely on good communication. This includes trust, and having respect for others' opinions.

One of the biggest problems the industry faces today, she feels, is a shortage of trained personnel. "During the economic crunch of three or four years ago, companies just stopped training programmers, and we are now feeling the effects; also, the high wages offered by the software contract houses make it rough for our type of company to compete. This creates a situation where one must struggle to keep one's own staff."

The immediate compromise which must be made, she thinks, is to move people around internally, or in some cases take on people with less experience than desired, and advance them as quickly as possible into positions of responsibility. "Employers must re-establish training programs to solve the needs of the future," she says.

Keeping in touch with people in the industry is important to Marian, and she finds attendance at the ICL Users' Convention useful for that reason. She has also found that attending seminars, symposia, analysis and design courses, and ICL courses, has kept her up-to-date with the latest technology.

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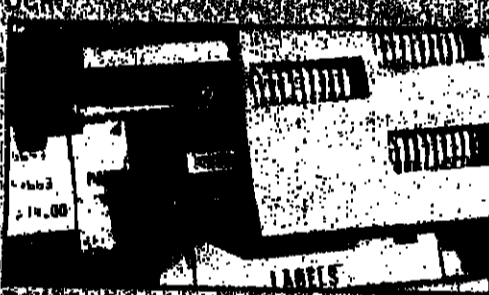
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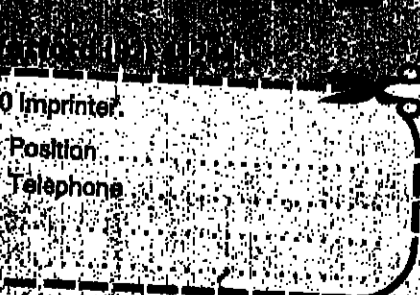
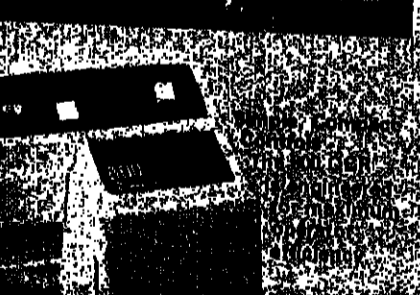
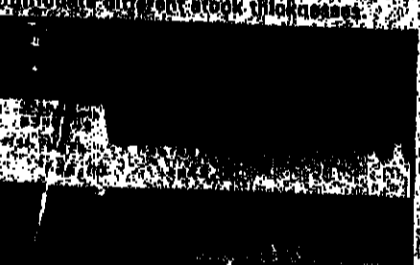
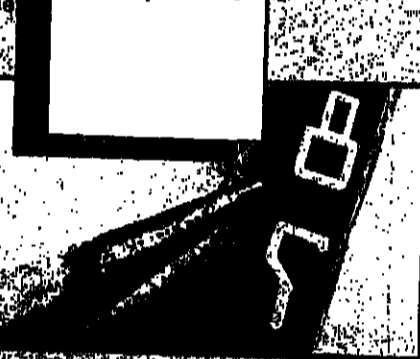
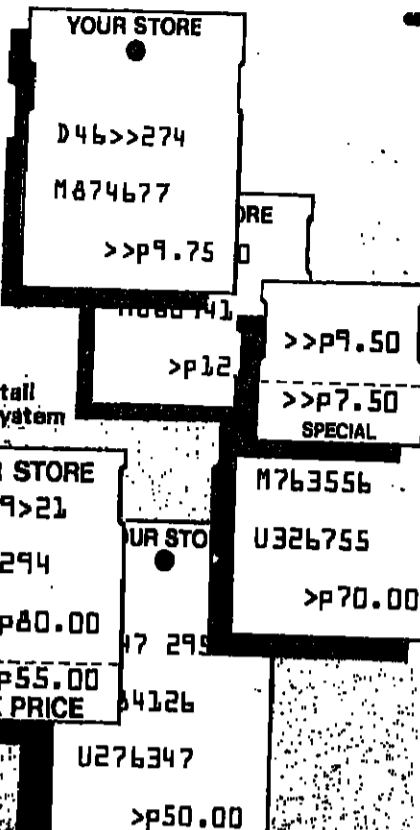
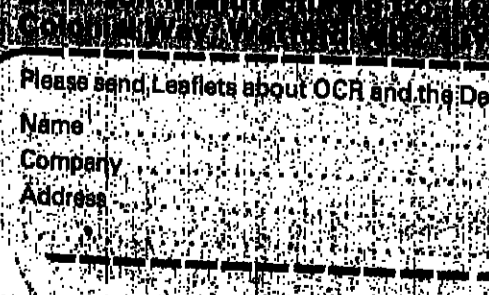
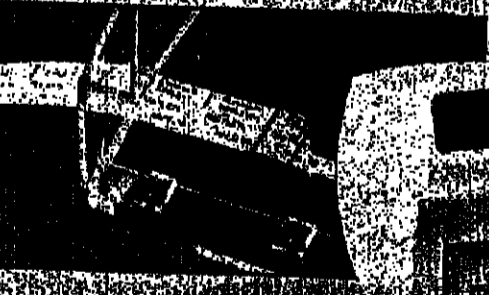
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DP 'pay explosion' is predicted

THE shortage of skilled computer staff has enabled senior DP personnel to obtain income increases, often through "fringe benefits". This is building up pressure on top DP executives that could explode once pay restraint is removed, wrecking the delicate balance between DP salary structures and the rest of the organisation.

That is the view of Ron Yearsley, a director of BIS Applied Systems, which has recently conducted an analysis of remuneration for senior DP people.

The survey showed, for example, that DP managers and other senior staff, such as project and team leaders, receive on average over £500 a year in fringe benefits, such as cars, luncheon vouchers, mortgages, etc.

On fringe benefits there is little differential between the team-leader level and DP managers or between the sizes of installations. In some cases the junior staff had better fringe benefits.

As the use of fringe benefits is one way round the government pay codes, this has caught the DP managers' in what Yearsley calls "a classical compression," between government pay policies and the rising demands of employees, boosted in the DP world by the acute staff shortages.

The BIS survey was conducted on the basis of 188 applicants who recently applied for two top DP posts, each with a salary of £12,000 plus a car.

Although Yearsley emphasised that the sample was too small to draw a conclusion on the absolute figures, he said they indicated some valuable information on trends, which bears out his own experience over many years in advertising companies on DP structures and the recruitment of DP staff.

An interesting aspect of the results is that, contrary to popular belief, salaries in the Midlands and South-East are very favourable with London and the South-East.

For large machines, the average total income for a DP manager in the North/Midlands was £11,800, while in the South-East it was £10,350.

The total incomes for DP managers on large machines in the BIS survey averaged at £11,070, including £560 in fringe benefits. For the team-leader level on similar machines, the average of the sample was £10,160, including £580 in fringe benefits.

For medium machines the differential in total incomes between the two levels was £10,210 to £9,500, with fringe benefits totalling £520 and £370 respectively.

For small machines, DP managers averaged at £9,000 (£520 fringe) while the next level down was £8,280 with a noticeably smaller fringe - only £120.

In calculating fringe benefits, car plus petrol was calculated as a cash value of £500 with car only at £300 per year.

A wages explosion for the top people might happen soon, said Yearsley. Coupled with the likely continued shortage of staff, this could mean that the DP organisation moves out of line with the incomes and structures of the rest of the company.

Yearsley said that this could happen at a time when organisations would be looking increasingly for corporate administration services directors to take charge of integrated DP and office information services.

"For a DP man to go up the company hierarchy, he should obey the general company structures and procedures. DP people should therefore be wary of getting too far out of step with the rest of the company," commented Yearsley.

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Ackoff's responses to these assumptions were related to information necessary to make decisions. Because most managers use intuition for a substantial part of the time, they are never sure exactly what information they require. If asked, in the course of the design of a management information system, they will naturally tend to cover themselves and ask for more information than they need. The result, very often, is an overwhelming amount of information.

The user is unable to cope, both in terms of volume of information and in terms of its richness. In order to make full use, it is necessary to look at interactions between the different variables, and this is necessary.

As far as organisational considerations are concerned, while greater communication of information between departments would appear to be valuable, if there is any degree of competition between them, then an increase in knowledge of other departments can upset the balances which often occur and therefore act to the detriment of the organisation as a whole. Also, without some knowledge of the criteria

which the system uses to make its decisions, it is possible for overall control to become slack rather than more precise.

Ackoff concludes that there should be far greater collaboration in the design of information systems. Information systems specialists, operations researchers and managers should all participate in the design process.

By now, this analysis is well-accepted; the lessons have been learnt long ago. Yet still the promise of management information systems is "just around the corner". To behavioural scientists, the analysis is interesting not for what it contains, which is entirely sensible, but for what it leaves out. Ironically, Ackoff's analysis of the implicit assumptions of systems designers is interesting for its own implicit assumptions.

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further deterioration. Organisations in this process tend to produce valid information for unimportant problems and invalid information for important problems. There is a high probability that the data necessary for design will not be made available.

From the manager's point of view, the information system specialist presents a considerable threat. He is talking about a control system which the manager only partially understands in a language which frequently seems obscure. Furthermore, the information system specialist is interested in validating his models. This means looking at what actually happens in an organisation rather than what is supposed to happen according to the organisational diagrams and job descriptions. It also means, for example, a need for information which people have learnt to keep to themselves until an anticipated occasion makes it appropriate to reveal it.

Making organisations more rational in this way, therefore, reduces the manager's feeling of freedom of action.

Also, few people like being told they are doing their job all wrong. Being coerced into changing decreases their feeling of importance to the organisation - and in any case the most likely reaction is not to accept it at all.

How can these problems be overcome? Two main changes need to be made. Firstly, managers must be given the opportunity to learn more about working with management information systems, and developing the skills necessary for decision-making at a new level. In particular this means learning how to take interactions between variables into account to a greater extent than before.

Secondly, both managers and the information system specialists must learn to cope with the problems of working in groups with potential conflict between them. The latter group, especially, requires much better skill in dealing with interpersonal problems.

And here is a reason for considerable pessimism. I have personally experienced these problems at first hand. I know Argvris' analysis is right, but I must watch my own assumptions.

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From Page 18

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The user is unable to cope, both in terms of volume of information and in terms of its richness. In order to make full use, it is necessary to look at interactions between the different variables, and this is necessary.

As far as organisational considerations are concerned, while greater communication of information between departments would appear to be valuable, if there is any degree of competition between them, then an increase in knowledge of other departments can upset the balances which often occur and therefore act to the detriment of the organisation as a whole. Also, without some knowledge of the criteria

which the system uses to make its decisions, it is possible for overall control to become slack rather than more precise.

Ackoff concludes that there should be far greater collaboration in the design of information systems. Information systems specialists, operations researchers and managers should all participate in the design process.

By now, this analysis is well-accepted; the lessons have been learnt long ago. Yet still the promise of management information systems is "just around the corner". To behavioural scientists, the analysis is interesting not for what it contains, which is entirely sensible, but for what it leaves out. Ironically, Ackoff's analysis of the implicit assumptions of systems designers is interesting for its own implicit assumptions.

In a study reported in 1971, the organisational

further deterioration. Organisations in this process tend to produce valid information for unimportant problems and invalid information for important problems. There is a high probability that the data necessary for design will not be made available.

From the manager's point of view, the information system specialist presents a considerable threat. He is talking about a control system which the manager only partially understands in a language which frequently seems obscure. Furthermore, the information system specialist is interested in validating his models. This means looking at what actually happens in an organisation rather than what is supposed to happen according to the organisational diagrams and job descriptions. It also means, for example, a need for information which people have learnt to keep to themselves until an anticipated occasion makes it appropriate to reveal it.

Making organisations more rational in this way, therefore, reduces the manager's feeling of freedom of action.

Also, few people like being told they are doing their job all wrong. Being coerced into changing decreases their feeling of importance to the organisation - and in any case the most likely reaction is not to accept it at all.

How can these problems be overcome? Two main changes need to be made. Firstly, managers must be given the opportunity to learn more about working with management information systems, and developing the skills necessary for decision-making at a new level. In particular this means learning how to take interactions between variables into account to a greater extent than before.

Secondly, both managers and the information system specialists must learn to cope with the problems of working in groups with potential conflict between them. The latter group, especially, requires much better skill in dealing with interpersonal problems.

And here is a reason for considerable pessimism. I have personally experienced these problems at first hand. I know Argvris' analysis is right, but I must watch my own assumptions.

People do not like being told they are doing their job all wrong. The most likely reaction is not to accept it at all. At least I can be careful not to coerce them into change.

By Malcolm Ballantine

Alison worked for the Net....

From Page 18

Her flatmate, Rose, had been in Zimbabwe for seven months. They had spoken two weeks ago. Perhaps she could visit her? Bank balance? Cheapest route? Suitable accommodation? Rose's whereabouts? Was it appropriate? Back it all came.

Fixed time travel was fast disappearing as prospective travellers stated their requirements to the Net, which then scheduled trains and planes with optimum efficiency, predicting demand, and keeping everyone completely informed of routes, times, and costs.

All travel was dear, and the cheapest used cancelled places. Her cheapest route included cancelled places on trains to Milford Haven, a cargo ship to Morocco, and zigzag journeys across the Sahara and Africa, with a 60 per cent probability of a cancelled place on a Zambian train.

She decided quickly. Through her Set, she booked the route, including a definite reservation in Zambia if no cancelled place occurred within one day of her arrival, arranged for messages to be sent to Rose, her employer, friends, and relatives, and diverted all incoming calls and messages to her route. She packed her suitcase and haversack, locked up, and set off for the village again.

The most enjoyable part had been living without money, and bargaining with shopkeepers in kind. This practice seemed to be growing, and most of the friends who shared her Set paid her with food. She was bored. She had long given up playing games with the Set as it could beat anyone at any game, and playing a suitably graded level that won only half of the time was not satisfactory.

COMPANIES in the Eurotech group will market the products of Gandalf Data Communications of Ottawa throughout Europe under a renewed one-year agreement.

An initial agreement signed in May 1977 was expected to generate \$250,000 worth of sales but was in fact worth double.

This year's agreement is expected to be worth \$1 million. Gandalf's UK sales are covered by Gandalf Digital Communications of Chesham. The Eurotech group is a wholly owned subsidiary of Cable and Wireless with HQ in Brussels, and national companies in West Germany, France, Italy and Belgium.

Recent work on the disappointing lack of success of management information systems gives ground for pessimism over forecasts that these systems will transform our business institutions within the next few years, says the author, Malcolm Ballantine, who lectures on ergonomics and the effect of computers at work for the Department of Occupational Psychology at Birkbeck College, London.

Will we ever have successful management information systems?

In a few years' time, management information systems will transform our business institutions. It seems a long time since statements like that were first made.

It still comes as a shock, though, to realise that Russell Ackoff's famous paper "Management Misinformation Systems" which identified many of the problems involved will soon be ten years old. Unfortunately more recent work on the disappointing lack of success of management information systems gives good reason for pessimism.

Ackoff identified the reasons for the lack of success in five implicit assumptions that he believed systems designers commonly made, all of which he challenged. These assumptions were that:

1. Managers lack relevant information.

2. Managers need the information they want.

THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)
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Wide experience in the structure of large computer-operating systems and in software engineering is essential. Proven ability to lead a large team of analysts and programmers will be given the preference. A thorough knowledge of English and a satisfactory knowledge of French or Italian are also required.

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His tasks: studies related to the choice of hardware; technical contacts with the suppliers; organization of the facilities, daily management and running of the hardware of the computing centre and of the teleprocessing network.

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To be charged, in the **INFORMATICS SUPPORT SECTOR**, with: coordination of the support to the users of the computer facilities; study and dissemination of information about programming techniques and methods; drafting/editing of practical guides for programmers and organization of educational activities; evaluation of application packages and support systems; development of utility software.

Good knowledge of programming techniques and practical experience with high-level programming languages for scientific applications are essential.

Proven ability to train and teach in the above-mentioned fields will be given the preference.

A thorough knowledge of English and a satisfactory knowledge of French or Italian are also required.

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WITHIN ONE MONTH OF PUBLICATION

The candidates are requested to apply separately for each post they may intend to compete for.

UNIVERSITY OF
LEICESTER

SYSTEMS ANALYST/ PROGRAMMER

Applications are invited from suitably qualified and experienced candidates for the newly established post of Systems Analyst/Programmer in the second instance.

The successful candidate will be responsible for the technical development of an integrated computerized report and management information system utilizing existing all principal areas of the University's administrative operations. To support this new development the University has ordered an IBM 7434 computer (PDP 11/24 variant) for delivery in July 1978. Further programming will be required once the Systems Analyst/Programmer is in post.

Applicants should be able to demonstrate a background in non-integrated data processing with experience of interactive computing and knowledge of PDP 11 technology.

Initial appointment will be made according to qualifications and experience on the Administrative Grade 16 scale (G16 to G17 per annum). Subject to satisfactory progress by the person appointed, the post offers prospects of advancement to the Grade 18 scale (G18 to G19 per annum).

Application forms and further particulars may be obtained from the Registrar, The University, Leicester LE1 7RH. In which case please send your application to the Registrar, University of Leicester, Leicester LE1 7RH. Closing date 12 June 1978.

UNIVERSITY OF SALFORD

SYSTEMS ANALYST

(Salary £4130-£8178)

Applications are invited from Systems Analysts or from experienced COBOL programmers who are looking for an opportunity to move into systems analysis and design for the vacant post of Systems Analyst in the Management Services Division of the Registrar's Department. The Division uses an ICL 2903 disk based computer to provide a computing service for the University administration. A wide range of financial and non-financial applications have been developed and require maintenance and expansion.

The successful applicant's salary will be fixed according to experience and qualifications.

Letters of application stating age, present occupation and salary and details of qualifications and experience should be sent to the Registrar, University of Salford, Salford M6 4WT, by 19 June 1978, quoting reference number A/695/CW.

ATC Display Systems-Saudi Arabia

Programmer/ Analyst

£18,600 tax free

Lockheed Aircraft International is involved in the provision and maintenance of a sophisticated Air Traffic Control network in Saudi Arabia. The systems make extensive use of computer techniques and this appointment will carry responsibility for the software functions relating to computerised display systems.

The work is varied and interesting. It covers modification of software programs; assisting DP Technicians in failure analysis by developing and running specialised diagnostic programs and updating software program library.

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Lockheed have recently increased their salary and benefits substantially for these posts providing:

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Our current hardware is an ICL 2904 and a knowledge of ICL COBOL and Software would be an advantage.

Applicants are invited to write to:
A. E. Wicks, DP Manager, A.D. International, D.P. Department, Churchfield Road, Watlington-Thames, Surrey.

LONDON BOROUGH OF ENFIELD

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£2,860-£3,282

Applications are invited for this vacancy in the Borough Treasurer's Department. The successful applicant will be required to assist with the operation of the Council ICL 1902T computer. Experience of ICL equipment and the George 2 operating system is desirable, but applicants who are otherwise suitably qualified will be considered for training.

If you would like further information ring Brian Perry, 01-368 6563 ext. 2573. If required, interviews can be arranged outside normal office hours.

For an application form please send an a.s.e. to the Borough Treasurer, P.O. Box 84, Civic Centre, Silver Street, Enfield, EN1 2XP. Closing date 23rd June 1978. Please quote reference ORA/184.

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£4344-£4615
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£5,797-£6,389 p.a. (incl.) + Car Allowance

The London Boroughs of Brent and Ealing are joint users of an IBM 370/145 Computer installation. The Computer Division is expanding into telecommunications and a property data base is established. We require an independent specialist to spearhead a new approach into computer audit in an advisory and supervisory capacity to the Internal Audit Divisions of both Brent and Ealing. The scope of the post will be wide and will cover controls on all systems, interrogations and use of test packs, operating controls, prevention of possible error, security of hardware and software and methods of safeguarding privacy and security of information.

Applicants should be senior systems analysts with experience of programming (preferably in Assembler and COBOL) and members of the British Computer Society or equivalent. Every opportunity will be afforded to fulfil the post-holder's ongoing training needs. Generous relocation expenses are available. 35 hour week. Flexible working hours may be introduced. Subsidised staff canteen at Brent and Ealing. Application forms and job description from the Administration Manager, Room 708, Brent House, High Road, Wembley, Middlesex, returnable 23rd June 1978. Tel 01-903 0371 (24-hour answerphone service) Ref No. F/38/D must be quoted.

Ealing
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THE UNIVERSITY OF
ASTON
IN BIRMINGHAM
COMPUTER CENTRE
Applications are invited for two vacancies in the Computer Centre to work in the following areas:

COMMUNICATIONS
The Centre currently has installed a Maco 184 and PDP 11, used for connecting users to the mainframe equipment and for linking the mainframe to the regional facilities. A Syntex 5000 series computer will shortly be installed to form a node of a network. Salary within the Other Related 1A scale £3188 to £6176 per annum.

SYSTEMS
An ICL 19040 provides the main service for the University and the work will involve the maintenance and development of the systems software provided. Salary within the Other Related 1B scale - £3188 to £5282 per annum. Applicants must hold a degree or equivalent and appointments will be made on the above scales. Application forms available from Mr. G. Reed, Staffing Department, The University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET. Tel 021-359 3111. Reference number 0/026/CW.

MPU Software Engineer

Required to join development team as software engineer - should have micro/minor machine code experience and a working knowledge of hardware techniques. Senior position with excellent prospects. Salary up to £5,900.

For further information please: Ken Partzski on (01) 848 3481 during office hours or write giving details of experience.

Data Controls Ltd., 148 London Road, Kingston-on-Thames, Surrey.

Gemini Contracts EURO UK

contract opportunities for experienced programmers - Register with an International Software Organisation
Telephone 01-828 6634
or telex 01-828 6634

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- SUSSEX - WITHIN EASY REACH OF COAST
- SENIOR PRODUCTION ANALYST - UP TO £7K
- ANALYST/PROGRAMMER - UP TO £5½K

THE COMPANY

We manufacture high quality components for the Electronic and Aerospace industry. We are leaders in our field and have a £36M turnover and a healthy profit. The Group employs 2,000 people.

THE SYSTEMS

The first phase of development is now completed - we have a sophisticated on-line enquiry and data entry system working. The second phase is now under planning and covers the classical MRP system.

THE JOB

We are looking for a systems analyst with several years' practical experience in Production Systems, who is ready for promotion to a senior position. The successful applicant will join an existing professional team. Prospects for future promotion are good.

We are also looking for a programmer with at least two years' Cobol experience and some Analysis experience whose long-term interest is in Analysis.

Assistance will be given with removal expenses

Please write enclosing details of previous experience to:

M. C. Sewell
Bowthorpe Hellermann Ltd.
Gatwick Road
Crawley, Sussex
Telephone: Crawley 28888

Computer Operations Manager

Salary £5,500 - £6,000

The person appointed to this senior position will be responsible for software maintenance and implementation, with particular emphasis on communications. Equally important are the responsibilities for shift organisation, scheduling and training. Reporting to the Operations Manager are our software programmers, shift leaders and operators, and Data Control staff. The successful applicant will have had commercial experience of operating with the I.C.L. 1900 using George 3, and ideally additional experience of communications software. At least two years experience as a shift leader, or one year in a Management position is also required.

Senior Systems Analyst

Salary £5250

The Analyst will play a leading role in the enhancement of existing systems, and the introduction of new projects to meet the ever growing needs of the Company. The project work involves close liaison with both user and programming departments, and the conducting of the necessary system tests.

The person we are looking for will have a programming background (ideally with a knowledge of COBOL) and have analysis experience in a commercial environment. The ability to work well within a small team, and establish good person to person communications with users is essential.

In addition to the salaries mentioned, there are the normal fringe benefits that you would expect from a National Company, together with relocation assistance if appropriate.

Male or female candidates should write giving full but concise details of age, qualifications, career history and salary progression to date, stating the name of any organisation to whom your letter may not be sent, to: R. D. Taylor, Regional Manager.

Whites

Whites Recruitment Limited
Phoenix House, 45 Cross Street, Manchester, M2 4JF
Offices: Bristol, Glasgow, Leeds, London and Warrington

UNIVERSITY OF SOUTHAMPTON NUMERICAL ANALYST

The University is seeking to appoint a Numerical Analyst within its Computing Service. The successful applicant will give a supporting advisory service to computer users in numerical methods as applied to the fields of pure science, and in techniques of mathematical model building. The University has access to very powerful computing facilities and a wide range of different architectures. The applicant will be expected to give sound advice on the suitability of different numerical methods. He/she will be especially concerned with the application of new machine architectures to numerical problems. Applicants should normally possess a postgraduate qualification in numerical methods or a first degree with a large content of numerical analysis. Experience of the application of numerical techniques to practical problems is highly desirable. Salary will be in the range £3188-£6176 per annum. Further particulars may be obtained from Mr. P. Vaughan-Smith, The University, Southampton SO9 5NH, to whom applications should be sent not later than 23 June 1978. Please quote ref. 1004/A/CW.

THE POLYTECHNIC HUDDERSFIELD

Department of Computer Studies and Mathematics
PRINCIPAL LECTURER,
SENIOR LECTURER OR
LECTURER II - COMPUTING
Ref ACA/228A

The principal degree and diploma courses within the department involve prior studies of applications of computers in business and industry. Applicants should have appropriate experience of at least one of the following areas:

- Information analysis and systems design
- Applications programming
- Design and implementation of data bases

A good Honours Degree and/or HNC is essential. Staff are expected to undertake activities including research, in addition to teaching duties.

Salary
PL £7247-£7816 (Bar) £5844
SL £5051-£7083 (Bar) £7572
LL £4101-£5558

Further details and application forms which should be returned by 23 June 1978 can be obtained from: The Careers Office, The Polytechnic, Huddersfield, HD1 1TA. Telephone 0484 22288. Fax 0484 22288.

ENJOY 'LIFE' IN YORK WITH YORKSHIRE-GENERAL

ANALYST PROGRAMMERS £4,500 + PROJECT LEADERS £5,400 +

As a staff member of our Company you will be located in the centre of York, enjoy a low interest rate mortgage, a non-contributory pension scheme and other benefits.

There is a high degree of PROFESSIONAL challenge in the work with an IBM 370/145 using DOS/VS and THIRST and in the development of a very large on-line data base. A clearly defined data processing plan exists providing many interesting applications which require a SIGNIFICANT expansion of our project teams.

ANALYST/PROGRAMMERS should have over two years experience, preferably including COBOL on IBM hardware. A knowledge of commercial/financial systems would be useful. Additional training will be given as necessary.

PROJECT LEADERS should have over five years DP experience gained in a commercial/financial environment. The ability to lead, motivate and co-ordinate the activities of a team is an important requirement. There is also an opportunity at a more senior level.

These posts will appeal to professionals who wish to develop on their past experience within a stimulating and dynamic environment. We are especially interested in applications from candidates with B.C.S. or C.I.I. qualifications.

Please write, or phone (reverse charges) C. W. Wood, Data Processing Manager

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Our Client, a busy engineering company, is currently developing several on-line real-time applications.

If you would like

- * To receive training in advanced IBM software
- * Develop COBOL programs involving database and TP systems
- * Work on a variety of applications projects
- * Five weeks' holiday a year
- * Excellent starting salary and conditions of employment
- * To join an active sports and social club

— and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref W3 0806

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Analysts and Programmers

MIDDLESEX

£5500-£6500

With the expansion of our clients development section, ideal opportunities now exist for Analysts and Analyst/Programmers

The successful applicants will enjoy working in a stimulating and highly professional environment and contribute extensively in the implementation of the company's future D.P. projects offering Analysts complete systems involvement and Programmers exposure to advanced software techniques and inter-active programming.

A sound knowledge of general commercial applications gained in a medium-size installation plus two years' programming and/or systems experience covering program design and implementation are prime requirements.

The company is a large organisation offering a secure future and career progression in addition to all the usual large company benefits.

Ref N3 0806

3 MONTHS IN CANADA Technical Analyst (Permanent)

c £7000

A TECHNICAL ANALYST with a sound knowledge of ICL 2903/4 equipment and COBOL preferably with T.P. experience is required by our client based in Croydon, Surrey.

The successful applicant's initial assignment will be to work with a team in Canada for a period of three months converting a system to ICL COBOL. The second stage of the project will be to work on the implementation of T.P.S. for this system.

Our client is actively involved in developing systems on mini and mainframe hardware and offers a variety of opportunities in financial applications.

The company provides excellent career prospects and comprehensive employee benefits. Overseas allowances are generous and the starting salary is negotiable depending upon experience but will not prove a problem for the right person.

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One year's COBOL experience can secure a first-class career for Programmers seeking to enhance their future in a technically stimulating and challenging environment. The Company offers a unique opportunity to acquire new skills in computing and other technical areas.

- * DUAL ICL 2960 hardware
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- * Career progression leading to Senior Programming and Analysis activities

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Ref N2 0806

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£5750/£6250
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Check your career objectives with this list.

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- responsibility and team leadership
- good prospects of advancement in an expanding installation
- excellent working conditions — new offices, staff restaurant

If this is what you are looking for, we would like to hear from you. You should have at least three years' analysis/programming experience, including upwards of one year's systems analysis, on any applications, any hardware.

We are recruiting for clients, a major West End installation. Please ring us, quoting ref. 678C, or leave a message on our answering machine after hours.

EDP Systems
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London W1N 7FF
Tel: 01-637 5796

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BURROUGHS 6700 COBOL Croydon
IBM OS, DOS BAL City
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Telephone: 01-890 3144

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Dublin: £5,500+

Our client, a leading Irish financial institution requires programmers to join their expanding DP Department.

- Ideally candidates should have:
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 - Knowledge of IBM Hardware & Software.

A working knowledge of on-line systems would be a distinct advantage.

An attractive salary is offered to suitably qualified applicants.

For further details please telephone M. Crotty, at (001) 710733.

Or write in confidence to: Applied Management Systems Limited, Chatham House, Chatham Street, Dublin 2.

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Grade S.O.2 E5209-E5512

Post Reference: 1515/CW

SYSTEMS PROGRAMMER

Grade A.P.5/SO.O.1 E4343-E5065

Post Reference: 1515/1/CW

PROGRAMMER

Grade A.P.4 E3681-E4212

Post Reference: 1515/2/CW

(Salaries include Phase 1 and 2 supplements)

BRIEF JOB DESCRIPTION

The reorganised systems development team is involved in developing and maintaining computer systems for a disc based ICL 1900 series computer.

The City Council is keen to perpetuate a successful record of computer systems development and implementation and enhancements to the hardware are under consideration.

Two Senior Systems Analysts are responsible for Systems development projects from inception to implementation and for the co-ordination of the work of project teams for major applications and must communicate effectively with staff at all levels in user departments both verbally and in writing. The Systems Programmers undertake the specification and design of Computer Programs and the programming of complex work and also assist in the co-ordination of the programming and associated activities of teams working on the larger systems.

Demonstrable ability and experience in Cobol programming is essential requirement for the Systems Programmer and Programmer posts and a working knowledge of PLAN.

Communications software or TP applications programming is desirable.

Applications will be considered from people in other professions and occupations who wish to pursue a career in programming and systems analysis.

These posts are permanent, supernumerary and subject to the satisfactory completion of a medical questionnaire.

Commencing salary will reflect experience and qualifications. Please write or telephone 081-783 3158 for an application form quoting post reference number to the 28th, to whom they should be returned by 23rd June, 1978.

Applications will be considered from people in other professions and occupations who wish to pursue a career in programming and systems analysis.

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- A good working knowledge of MVS, SVS, VS1 or DOS/VS
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- Desire to work in an environment where ability, enthusiasm and results are the criteria for success rather than age or paper qualifications
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PROGRAMMER

To join Regional Heart Study team (MRC grant) doing large scale survey throughout Britain into the causation of heart disease.

The appointment involves a wide variety of computing applications (see below) and the successful candidate will be involved in the development and maintenance of financial and non-financial applications. The Authority currently has a 32K N.C.P. Century 150 Computer, but future requirements are being re-appraised at present. Candidates should be conversant with Next/3 and/or Cobol, and have previous extensive experience of communications and Non-Financial applications, including working in an 'on line' environment.

Job Descriptions and Application Forms available from the Personnel & Management Services Officer, Civic Offices, Colshill Street, to whom they should be returned by the 23rd June, 1978.

CANVASSING DISQUALIFIES

G. A. McClintock, Chief Executive

Applications, with two references, by June 18 to: Mr. G. A. McClintock, Dept. of Clinical Systems, Royal Free Hospital, 21 Pond Street, London NW3 2PF. Tel. 01-761 0551, ext. 15, for details.

DELYN BOROUGH COUNCIL
Borough Treasurer's Department

Systems Analyst/Programmer

AP5-SO1 E4343-E5061 inclusive of supplements

Applications are invited for the above post, located in Holywell, Chwyd. The successful candidate will be involved in the development and maintenance of financial and non-financial applications. The Authority currently has a 32K N.C.P. Century 150 Computer, but future requirements are being re-appraised at present. Candidates should be conversant with Next/3 and/or Cobol, and have previous extensive experience of communications and Non-Financial applications, including working in an 'on line' environment.

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PL/I PROG

LONDON
Well-established D.P. Division of major international co is rapidly expanding and consequently seeks PL/I programmers with significant years' of experience they offer:
★ Training in Database and CICS
★ Variety of well-planned projects
★ Promotion prospects with a progressive company
★ Staff restaurant
★ Salary to £7,000

Ref. 1478

MINI PROGS

LONDON/HOME COUNTIES
Prestige company based in USA, Europe and U.K. are recruiting persons at varying levels from programmers to systems specialists for their new City offices. Having Large DEC PDP equipment, they seek people with experience on any MINI but using ASSEMBLER, they offer:
★ Extensive training in up to date technology
★ Excellent career opportunities
★ Training in RSX RTII and RSTS
★ Chance to travel abroad
★ Salary £8,000-£10,000 p.a.

Ref. 1478

ANALYST PROG

CITY
Worldwide financial concern retaining IBM Sys 3 seek analyst programmers at varying levels with 2 years' RPG II experience co offer:
★ Opportunity to attain Project Leader level
★ Training on CDP
★ Newly planned projects
★ Exciting growth potential
★ Salary to £8,500 + perks

Ref. 1847

SENIOR ANALYST

MIDDIX
Our client, a major organisation, situated close to both M4 and M3 motorways is seeking a senior analyst to act as PROJECT LEADER on a wide range of applications. If you have approx. 3 years' systems experience preferably in ICL 1800 series environment, and are able to demonstrate a professional approach to project management apply NOW!

- ★ Co offers
- ★ Job security with a prestige concern
- ★ Responsibility
- ★ Excellent working environment
- ★ Free lunches, free life assurance
- ★ Salary £8,500 + company car

Ref. 1829

ICL PROGRAMMERS

LONDON
Due to development of their advanced computer systems, successful D.P. Services dept. seeks to boost its programming team. Retaining large ICL 1800 equipment they offer excellent opportunities for persons with min. 2 years' ICL COBOL experience. Co offers:
★ Involvement in development of IDMS Database

- ★ Development of variety of applications
- ★ Progression to analysis with secure career path
- ★ Exc. perks include flexi hours — 8 weeks holiday
- ★ Salary to £8,500

Ref. 1848

IBM PROGRAMMER

HERTS
Our client, a sophisticated computer and technology company has openings for a number of experienced programmers. Candidates should have at least 2 years' experience on any high level language. Co. offers:
★ Development of real time systems
★ Exciting and interesting work in up to date technology
★ Excellent career prospects
★ Subsidised lunch, pension scheme and other company benefits
★ Salary £8,000

Ref. 1802

NCR PROGS

LONDON
Our client, an international company covering a large range of NCR mainframes and minis seek COBOL programmers at all levels. They are involved at present in a variety of commercial, financial and industrial projects. Co offer:
★ Training opportunities for IBM, ICL or UNI-VAC COBOL progs
★ Extensive training on new machines
★ Career development in systems
★ Excellent co. benefits
★ Salary to £8,000

Ref. 1327

IBM PROGRAMMERS

LONDON
Multi national co retaining large IBM 370 equipment require programmers with min. 12 months' exp to join highly professional team. Currently developing a major sophisticated on-line real-time system the co offers:
★ Major established co with interests in U.K. and overseas
★ Well-planned long term schedule
★ Excellent opportunities for training and future openings for analysis
★ Excellent benefits including generous holiday concessions
★ Salary to £8,000

Ref. 1290

JNR PROGS

LONDON
Challenging careers await persons with approx 12 months' programming exp on any machine, any language, with drive and enthusiasm who want to follow a positive career path. Opportunities as follows:
★ Training in T.P. and Database
★ Development work on new sophisticated systems
★ Career progression with forward thinkers
★ Up to date technology
★ Salary to £4,800

Ref. 1660

HONEYWELL ANALYST PROG

LONDON
Manufacturing company producing a wide range of household goods is seeking an analyst programmer with at least 2 years' COBOL experience. The successful applicant will join a professional and enthusiastic team utilising Honeywell Mainframe and preferably had GCOS experience. Co offers:
★ Excellent working environment
★ Good career prospects
★ Life Ass, BUPA, LVs & 4 weeks hols
★ Discount on all company products
★ Salary to £8,000

Ref. 1493

ANALYST PROGRAMMER

HOLLAND
Our client is a major organisation meeting the ground power needs of world's airlines by engineering a broad range of products to clients in more than 100 nations. Retaining Honeywell 62/40 under GCOS, they seek persons with 2-3 years' COBOL exp.
★ Responsibility as the No 2 to the D.P.M.
★ Lots of user liaison
★ Variety of interesting applications with Honeywell IMS package
★ Excellent fringe benefits
★ Salary DFL 42-48,000 (£12,000)

Ref. 1838

JUNIOR PROG

LONDON
Our client, a prestige commodity with offices throughout the world are seeking PL/I programmers. They retain IBM 370 hardware and if you have 1 or more years' PL/I experience apply NOW for this fantastic opportunity. Co offers:
★ TRAINING in other high level languages
★ TRAINING in software
★ TRAINING in systems generation
★ Salary £4,500 to start

Ref. 1818

IBM PROGS

SURREY
Major UK company wishes to strengthen its successful programming team. Retaining IBM 370 under DOS VS, they seek people with at least 18 months' COBOL experience to enhance their existing projects and to program new projects. Co offers:
★ Training in DLI and CICS
★ Excellent career prospects
★ Good working conditions
★ Salary to £8,500

Ref. 1881

IBM PROGS

N.W. KENT BORDERS
Our client, a prestige Bank, are recruiting programmers with at least 18 months' COBOL experience. Retaining IBM 370 under DOS VS This is a great opportunity for a competent and ambitious programmer to join a professional team. Co offers:
★ Very good promotional prospects
★ Training in CICS
★ Excellent working conditions
★ Salary to £8,000 + CHEAP MORTGAGE

Ref. 1386

IBM PROGS

HOLLAND
Our client an American publishing company has vacancies for programmers with at least 3 years' COBOL experience. The company retains IBM 370 hardware and the successful applicant will be involved in a variety of commercial applications. Co offers:
★ Beautiful offices in a pleasant part of Amsterdam
★ Opportunity to work in an expanding World-wide organisation
★ Good career prospects
★ English Speaking environment
★ Salary 40,000 Guilders (£10,000)

Ref. 1803

Programmers & Analysts UNRUT YOURSELVES

Stimulation, variety, and challenging work environment, new problems to solve, rewards to match your ability — that's our offer. Our aggressive, dynamic, and adaptable approach has earned us a steady share of the market and we are now poised for further expansion. We consider

ourselves the best in the field — and with reason. People are our major asset and when we recruit we have the resources and opportunity to attract the best.
At the moment we need mobile professionals with varying degrees of experience.

PROGRAMMERS

COBOL PROGRAMMERS • BASIC PLUS PROGRAMMERS • IBM ASSEMBLER PROGRAMMERS • PDP11/MACRO11 PROGRAMMERS
also PL/I HONEYWELL TDS, IMS/DLI and DB/DC

however, whatever your computer work background, we want to hear from you.

ANALYSTS

Mainframe and Mini experience with particular emphasis on people able to control a team of programmers and manage all aspects of our customer contact.

We need people with imagination and versatility to work on a variety of projects which include turn key systems, conversion and transition, specific customer implementations.

In return we offer a chance to widely increase

your experience, to negotiate your salary and to develop your career in a highly motivated organisation that is growing fast.

Contact us now: Phone Penny Bailey on 01 302 9355 (24 hours). Find out more about our current plans and if you are impressed we will arrange a convenient interview for you.

Marcol Computer Services Limited, 10 Queens Gardens, London W2



This is only a small selection of posts we have available at present. If however, you don't see anything to suit your requirements please do not hesitate to telephone us. We have a wide choice of jobs at varying levels throughout the U.K.
For the above positions — please telephone 01-734 0152/3010 (24 hours) quoting the respective reference number, or write to our London office

CONTRACT DIVISION

Computing Services Association

U.K.

ICL 1800 GII COBOL	MIDDIX	£180 pw
IMS COBOL PROGRAMMERS	HERTS	£230 pw
ICL 1800 PLAN DRIVER	HERTS	£220 pw
CICS ASSEMBLER	CITY	£280 + pw
CICS ASSEMBLER	SURREY	£270 + pw
IBM DOS PL/I	EAST MIDLANDS	£200 pw
IBM DOS VS CICS VS PL/I	EAST MIDLANDS	£230 pw
IBM DLI	MIDLANDS	£225 pw
IBM DOS VS COBOL	LIVERPOOL	£200 pw
OS COBOL	SURREY	£180 pw
OS COBOL	N. LONDON	£180 pw
IBM RPGII	ESSEX	£200 pw

For Midland and N. England requirements phone 061/833 9341/5 (Manchester) or 021-236 1794 ext 223 (Birmingham). For all other contracts phone London Office, Christine Kay or Dave Hayton, 01-734 0152 (24 hrs.)

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COMPUTER OFFICER

£5 000 to £5 350 plus casual user allowance \$01

Hatfield's Comprehensive Housing Service is looking for a person who has computer systems development experience and who would now like to put this experience to use in an effort to improve the operational efficiency and information systems of the Housing Service in the interests of the public.

An enthusiastic, self-motivated person is therefore required who can ensure that the Housing Service's computer systems are fully developed and utilised.

This is a new post which is based within the Housing Service to ensure that benefits derived are service orientated. The post holder will also be required to liaise closely with an existing Housing Development team, whose main role is to develop the use of a joint computer system, on line, computer network L.O.L.A., which uses an IBM 370/158. The successful applicant could work on any Housing Service function which requires computer systems support (e.g. property records, rents, waiting lists etc.) and should have the ability to liaise closely with other officers to understand and identify areas where computer development is needed.

Application form and job description from: Chief Administrative Officer, 13/27 Station Road, Wood Green, N.22. Applications returnable by 21st June, 1978.

COMPUTER PROGRAMMER

London up to £3900

British Gas are looking for an experienced Programmer to work in their Exploration department based at Marble Arch.

The job involves writing, without supervision, computer programs in FORTRAN for the Engineers of the Petroleum Engineering Section. Knowledge of Univas 1100 'Exec 8' job control language would be an advantage but is not essential. You should have 'A' levels in Science and Maths and experience in programming for scientific applications.

Salary range £3200-£3800.

Please write with full details of age, experience, qualifications and current salary, quoting reference PS/724701 (745), to the Senior Personnel Officer (London), British Gas, 59 Bryanston Street, London W1A 2AZ. Closing date for applications 28th June, 1978.

BRITISH GAS

TSB TRUST COMPANY LTD

Systems Development in Hampshire

Salary Negotiable + Fringe Benefits

Our earlier advertisements attracted some key people to join our projects in Hampshire but we have additional opportunities for the right people now.

We are a life insurance and unit trust Company and we are growing fast — we need sophisticated systems to support our continued expansion. We are committed to developing an integrated insurance system to replace all existing systems using modern technology such as database, real-time on-line facilities via VDU etc. on our new Birtoughs 8800 system.

We can offer a stimulating career and first-class rewards to those who can help us in our ambitious plans. We have opportunities now in software development, systems analysis and in application programming. We are looking in particular for experience in the following fields —

- Real-time applications
- Database technology
- Birtoughs Medium systems

We would like to hear from you. Those of you who join us will enjoy a comprehensive package including competitive salary, plus mortgage subsidy facilities, non-contributory pension, life insurance and permanent health schemes. Generous relocation expenses will be available for those who move to join us.

Telephone Answer 82188 Ext. 207 or write now for an application form to:

TSB Trust Company Limited, White Bear House, 21 Chantry Way, Andover, Hants, SP10 1PD.



Anglian Water Authority

CORPORATE PLANNING

To £5,000 (NJC Grade 6)
★ Plus New Award from July 1978 ★

Do you understand computers?
Can you analyse situations and make computers work for you?
Can you help us to analyse the effects and benefits of our Capital Development Programme?

The Anglian Water Authority invests £300M every 5 years on the water services in an area covering one-fifth of England. The investment data base is currently held on DEC PDP10 but will shortly be transferred to the Authority's own Honeywell 68/10.

If you have a flair for problem solving and want to join a small professional team of Corporate Planners, contact us but only if you can pull your weight.

We are looking for one good Programmer with at least 3 years at the senior level who wants to broaden his/her scope. Previous experience of mainframe computers and how to make them do the work. Programming experience in FORTRAN is an advantage as would experience with Honeywell 68/10 on Dec PDP 10 machine, but we are prepared to train a person with the right attitude and proven ability.

If you are interested or want to know more about this opportunity, why not call Peter Cowie, Huntingdon (0450) 58181 Ext. 283 for information and an application form.

The closing date for applications is 22nd June, 1978 and should be sent to:
ANGLIAN WATER AUTHORITY
Diploma House, Grammar School Walk
Huntingdon, Cambs. PE18 6NL

Fortran Programmer

Up to £5,000

Our client, a major Civil Engineering Contractor is looking for an experienced engineering/scientific computer programmer to join an established team concerned with writing, developing and maintaining computer programs for a variety of Municipal Engineering applications.

The computer facilities are situated in modern office accommodation in West London and include in-house mini-computers with plotting and graphics display peripherals.

You should have a minimum of 2 years' experience in writing FORTRAN programs, preferably using mini-computers, together with the ability to work efficiently with a minimum of supervision.

In addition to a salary in the region of £5,000 p.a., the substantial range of benefits usually associated with a large successful organisation are offered. Please write with details of your career to date to: N.S. Holter, at the address below, quoting ref. FP/260 CW Ltd on a separate sheet Companies to which your reply should not be forwarded. All replies will be answered.



CONFIDENTIAL REPLY SERVICE
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197 Knightsbridge, London SW7

Rural Staffordshire CHIEF PROGRAMMER

Salary up to £6,750

This is a unique opportunity to join a D.P. Department within a dynamic manufacturing concern. The present installation is COBOL based on a medium scale processor, employing VDUs and intelligent terminals and this is to be replaced by new generation hardware in the immediate future.

Candidates should have at least two of the following:

- ★ four or more years' programming experience
- ★ fluency in COBOL
- ★ real-time experience
- ★ sound technical knowledge
- ★ a positive approach and desire to contribute to a professional data processing department

The company offers superb working conditions and generous relocation assistance in an area of low-cost housing.

Interested candidates who have a genuine desire to accept the challenge of this thoroughly stimulating position should in the first instance:

CONTACT RICHARD CHAMPION ON 021-236 3781

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Freeport, Blackfriars House, The Personage, Manchester M3 8BB
LONDON 01-935 0671
Freeport 4, 102, Blomfield Street,
London W1E 1JZ

SCA Computing
Services
Association

Analyst/Programmers for Management Consultancy to £5,500

Due to continued growth we have opportunities for analyst/programmers of high potential to join the UK division of our international management consultancy practice. Vacancies exist in our London, Birmingham, Manchester and Newcastle offices.

The work of our analyst/programmer group includes developing effective DP systems, supporting and implementing software packages, providing technical assistance in the use of audit interrogation packages and assisting experienced consultants on a wide variety of DP assignments. The work takes place in the UK and overseas and is challenging and demanding as clients expect and receive a service of the highest quality, working to tight time and cost budgets.

We would like to meet young analysts and programmers with current knowledge of a major supplier's hardware and software in a commercial environment who are seeking to broaden their experience and careers. Work on mini-computers with a high level language would be an advantage. All important are intelligence, ambition and enthusiasm. In addition we will consider applications from bright, mature graduates without DP experience. Formal and on-the-job training in DP and management will be provided.

Starting salaries will be negotiated up to £5,500 with substantial allowances for overseas work. Career opportunities are excellent and can lead to salaries in excess of £12,000.

If you would like an informal talk please call (reversing charges if long distance) Patrick Kiernan or Jim Keenan on 01-407 8989 or write to either at Southwark Towers, 32 London Bridge Street, London SE1 8SY, asking for an application form and quoting MCS/3692.

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Waterhouse
Associates**

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Computers

Tehran

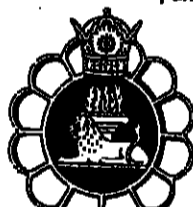
There is a vacancy for the above post at the Computer Training Division of the National Iranian Oil Company in Tehran.

The person appointed will assume responsibility for courses and training programmes in conjunction with the Training Department. This will include the design of curricula in areas of data processing using systems analysis to determine training requirements for the company and users.

The successful applicant will also be required to develop appraisal techniques for members of staff and update the Department on educational technology.

Proven ability in a similar position with teaching experience at an advanced level in data processing is necessary, together with a degree and/or postgraduate qualification in Computer Sciences or a related field.

An excellent salary and benefits packages are offered. Please apply as soon as possible to



Mr. A. Etamadi
Head of Administration
National Iranian Oil Company
Granville House
132/135 Sloane Street
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01-491 4706

Staff Services Division
of BOC Data Service Group and a member of
SCA Computing Services Association

Senior Analyst Programmer Analyst Programmer

Our client situated in Lancashire, is one of the U.K.'s foremost engineering groups with its products being sold and recognised on a world-wide basis.

In addition to major new developments being introduced in many business activities, the Payroll System is to be replaced by the implementation of the UNIPAY package.

As a result of this development vacancies have arisen for a SENIOR ANALYST PROGRAMMER and an ANALYST PROGRAMMER to assist in the implementation of UNIPAY.

Applicants should have current experience of UNIPAY. Familiarity with IBM Assembler is essential.

Our clients policy is one of continual improvement resulting in many opportunities to join development or enhancement projects. Successful male or female applicants can expect to earn an excellent salary plus productivity bonus and many unique fringe benefits including generous relocation assistance where applicable.

Applicants should write giving full but concise details of age, qualifications, career history and salary to date stating the names of any organisation to whom their application may not be sent to: R.D. Taylor, Regional Manager.

Whites

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IBM	DOS	OPERATOR	1yr+	C. LONDON	£3800
IBM	OS	OPERATOR	1yr+	C. LONDON	£4000
IBM	OS	OPERATOR	1yr+	CROYDON	£3700
IBM	OS	SNR OP	18mths	SUSSEX	£4000
IBM	OS	SUP(DAYS)	18mths	W. LONDON	£4200
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My client operates a sophisticated computer communications network on a world-wide basis. They need a technical consultant to advise and support users on the usage of complex high speed network facilities.

You will be my client's source of understanding on all aspects of synchronous transmission protocols and methods. The post covers assessment of a whole range of terminals (hardware and software) and liaison with different manufacturers.

To be successful in this role demands 'A'/HND level qualifications and approximately 5 years in computing, including some sound teleprocessing experience.

Contact DAVID J. HUTCHINSON for further information.

RW 22/1

OPERATIONS

A dynamic and fast moving bureau is probably the most invigorating working environment for operations personnel and our clients are just that. This very professional company offers both BATCH and ON-LINE facilities from computer centres situated in BUCKS and the CITY.

SHIFT LEADERS to £4,250
(days only)

BUCKS

If you are young, competent and ambitious enough to see yourself moving upwards into operations management within 2 years then please apply. As a senior man in a small team you will liaise with customers. Aged around 23/25, preferably with 'A' levels, you should have c 3 years' ops. experience including on-line. Full training, including programming, will be given.

TRAINEE OPERATORS to £3,000

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Superb opportunities exist for bright young people to make their entree into computing. Aged 20-ish, you should be alert, able to communicate well on the telephone and keen to take full advantage of the training offered (which includes programming).

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RW 22/3

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Are you fed up with hacking out those same old boring systems? Is your only real career progression a larger salary? YES — then read on.

My client can offer a constant stream of unusual and interesting applications and the opportunity to enhance your technical expertise and enjoy more responsibility and user contact. They are one of the industry's leading technical corporations and develop systems over a wide spectrum of business. All systems are developed in a high level language interactively, on-line and are implemented on a database network that literally spans the world.

So forget about sales and purchase ledgers, etc., and gain some real job satisfaction within one of the fastest market growth areas:—

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RW 22/2

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As a SUPPORT CONSULTANT you will represent one of computing's leading names in the decision making process of senior User management. You will support an already established user base to such effect that the customers are able to enhance their usage of this manufacturer's services. User management will look to you for solutions of business problems through the use of computers and the specification of the requisite systems.

You need customer acceptability, programming experience and preferably some exposure to database. Your practical experience may have been gained in Management Services, Operational Research or Corporate Planning functions within Finance, Banking, Insurance, Manufacturing, Retailing, etc., it matters not. What does matter is personality and the desire to enhance your own commercial business skills. Your future career development is then up to you.

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RW 22/4

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EMS has just embarked upon a major new diversification with a £2-£3m capital investment project, starting initially with a large sophisticated Data Centre just opening in Birmingham with additional regional centres to open throughout the U.K. during the next two years. Each centre has large hardware development and demonstration areas and numerous software/applications systems development areas. EMS initially will be embarking on a dual system approach, providing both Honeywell Level 6 and ICL 7602s linked to our own mainframes. Equally, substantial investment in package development has been initiated, with teams already at work on a wide range of applications projects. We urgently seek only experienced salesmen capable of working on the promotion of hardware and software systems, with an adequate knowledge of application requirements. EMS have a specialist division dedicated to customer support able to take a large amount of conventional software assessment away from salesmen enabling them to substantially increase their marketing availability. We envisage highly motivated salesmen being recruited to sell and present equipment to seminars of clients numbering up to 100 as well as to negotiate without support on occasions at client board level. Earnings should be very attractive for experienced salesmen.

Consultant: John Wood.

ANALYSTS & PROGRAMMERS BIRMINGHAM

TO £5500

The EMS Data Centre at Fiveways, Edgbaston, is currently expanding the Turnkey Systems Division to cope with substantial applications and package development across all business areas. Subsequently, we need experienced, motivated staff able to work to agreed schedules and switch from one applications project to another as directed by Management. Analysts should hold a current driving licence to enable them to make regular visits to U.K. clients in order to discuss individual requirements. Programmers must have COBOL knowledge. Full standards and hardware training will be supplied by EMS at our Data Centre for suitable candidates.

Consultants: Dennis Filby/Damien Hendall.

1,000 COBOL/ASSEMBLER PROGRAMMERS U.K.

£3500-£6000

EMS currently has over 1,000 vacancies all of an urgent nature throughout the U.K. including a large quantity within London and the Home Counties, West Country, West Midlands, North-West, Yorkshire and Scotland. A vast choice exists for all applicants irrespective of location. Vacancies are being notified to EMS at the rate of 200-300 each week. Why miss out on this vast market selection for yourselves. Join thousands of other satisfied EMS users - let the professionals get early results for you. It doesn't cost you anything. With six months' experience upwards, complete the attached application form today.

Consultant: Salina Mills/Carol Proudman.

IBM ASSEMBLER PROGRAMMERS LONDON, NW1

TO £5000

A major IBM user, with extensive on-line and real-time networking has urgent requirements for numerous additional programmers to work on the current multi-user system and to assist with ongoing development work. Many fringe benefits exist for experienced ASSEMBLER Programmers including low cost international holidays, etc. Equally, early career progression is possible for motivated programmers. Don't delay, complete our application form today and we will have you in interviews within five days with lucrative offers to follow if your experience is suitable. Equally, we have many other for you as ASSEMBLER positions throughout London.

Consultant: Don Philp.

IMS DESIGNERS AND PROGRAMMERS TO £8000

We currently have large quantities of vacancies throughout London, Home Counties, Midlands and Northern Counties for staff with previous IMS experience, either in industrial or commercial installations. Excellent employment opportunities exist with a large data bank of EMS clients throughout the U.K. Unrivalled elsewhere, why not try it? Experience, simply complete the attached application form and let EMS rapidly get interviews arranged and early results for you.

Consultant: Neil Bradley.

EMS CONSULTING CAREERS

The Group has a range of career development opportunities second to none in the U.K. covering all ranges of employment from front end consultancy to back end package development. Facilities Management and Applications Development at our regional Data Centres.

EMS Consultants are currently working throughout the entire U.K. assisting such clients as Government Agencies, Electrical Manufacturers, Bureaux, Distributors, Chain Store Groups, Engineers and Minicomputer Stand Alone or Network Users.

EMS in addition have the only large Data Centre Development unit in the country, based in Birmingham and accommodating up to 150 people. Futuristic training and demonstration facilities have been incorporated within this unit. All work station desks have their own terminals incorporated for program development where appropriate. Extensive package design and development is already in progress to support our Honeywell Level 6 Turnkey Systems sales. We offer wide diverse applications involvement, in all trading areas with the opportunity of UK or international travel, if required. Conversion training to Honeywell hardware will be supplied for otherwise acceptable candidates. Without doubt, EMS will be the place to be during the 1980s. Join now and secure a Managerial position early with a rapidly growing market leader.

ANALYSTS & PROGRAMMERS LIVERPOOL

TO £6500

A major distribution organisation have expanding requirements for more experienced staff to work on a wide variety of commercial projects. Some projects include being developed include stock control, distribution systems, point-of-sale, sales order processing, depot stores accounting and payroll. Many projects incorporate on-line working. Data-base systems are also being developed within the group. Our client has a vast hardware commitment offering scope to work for one of the largest installations in Europe. Complete the attached form for any early interview.

Contact: Denis Filby.

ANALYSTS - STAFFORDSHIRE

TO £6000

A large processing group of national repute, has 10 systems vacancies for Analysts with a minimum one year's experience. The group has a wide range of advanced, sophisticated management information systems currently operating and plan further development within the area. A knowledge of PL/1 or BAL would be useful although not essential.

Excellent management appraisal and training schemes exist within the group offering candidates the opportunity of gaining diverse and valuable management services training. In addition to attractive salaries, various fringe benefits are available and adequate relocation assistance. Housing available within the region is adequate and sensible. Again, the countryside is within easy reach of the company and a large shopping centre is available for housewives. The Group in question is a leading national employer with sound industrial relations and a progressive DP expansion plan during the coming year. Please complete our application form without delay for early interview.

Consultant: Don Walklate/Anne Lennell.

PL/1 PROGRAMMERS SOUTH & MIDLANDS

TO £6500

EMS currently have a wide range of PL/1 vacancies both for users and consultants throughout the United Kingdom. Most vacancies involve development projects for major users, often with in-line involvement. Clients include bureaux, distributors, engineers, manufacturers, etc. A wide choice exists for all applicants, just complete the attached form, today and let EMS get rapid results for you.

Contact: Neil Bradley.

EMS Consultants Ltd.
61-63 Lower Street
Newcastle-under-Lyme
Staffs ST6 2RS
Telephone 0782 623665
(10 lines)
Register NOW!

NOTTINGHAMSHIRE IBM PROGRAMMERS

TO £4500

A large distribution based organisation requires experienced IBM Programmers with from one year's experience upwards of COBOL. Programmers currently resident within Notts would be especially welcome. Our clients offer the opportunity of working on a wide variety of distribution based applications with possibilities of future career development in specialised programming or with the option of a move towards systems. Applicants must be educated to at least HND or degree level.

Consultant: John Wood.

TIMESHARING SALESMEN MIDLANDS & NORTH

TO £8000

EMS are currently planning the launch of a major time sharing service throughout the North and Midlands based on ICL and Honeywell hardware. Both packages and custom-built system facilities will be available. Primary clients will purchase or lease their own printers, videos and concentrators from EMS, therefore, having total control of their own data preparation. Both on-line and batch facilities are currently available with adequate staff back-up facilities within the EMS Group to handle virtually any range of customer requirements. All candidates must have a proven track record in the timesharing field and be capable of negotiating SK to SK contracts. Opportunities exist also to market in addition, Consultancy Services, Turnkey Systems and Recruitment Services to optimum earnings.

Consultant: John Wood or Niall Bradley.

IBM PROGRAMMERS & OPERATORS WEST MIDLANDS

NEGOTIABLE

Our clients, a large engineering group's centralised group computer bureau need additional staff to assist with both development projects and maintaining current systems. Experience of RPG 2 or ASSEMBLER is required preferably having spent at least six months on 370 hardware.

Consultant: Carol Proudman.

PROGRAMMERS TO ANALYSTS LONDON BANKS

£5000-£9000

Our client, a leading international bank, is engaged successfully in numerous international funding projects. Senior Database/Teleprocessing Analysts capable of team leadership are required. Equally, a background involvement at some point is necessary in COBOL. This client is prepared to pay c £9000.

Senior Analysts with personal experience of taking jobs through from feasibility studies to implementation with a COBOL Programming background and applications experience in an on-line banking or insurance environment are preferred but not essential. Senior Analysts must show the aptitude for team leadership. For these appointments, the client will pay circa £8250.

Senior Programmers with at least three years' COBOL programming and the ability to design complex suites of programs are required. Previous experience of systems design and on-line/real time processing will be an advantage. Good communications skills will be required with aptitude to develop your managerial skills. A package in the region of £7250 will be offered.

Programmers with at least 18 months RPG II experience, preferably on IBM System 32 or similar hardware are required. The candidate will be involved in program design, coding, implementation and the preparation of documentation. A salary package of c £6250 will be offered.

These and numerous other vacancies will be offered, and must be the best banking vacancies in London today. Take this opportunity of winning one for yourself through EMS. Complete our enclosed application form today. Interviews next week and offers the week after. That's EMS for you.

Consultant: Don Philp.

SYSTEMS MANAGER IBM SYS.3 NORTH LONDON

TO £8500

Main responsibilities will include carrying out feasibility studies, evaluating the cost benefit of system proposals and preparing systems specs for handing over to Programmers. Equally, duties will include systems testing, implementation and supervision with one, and later, probably two programmers. Programming experience of RPG2 would be advantageous, as would 3 years' systems analysis experience and design involvement. Teleprocessing experience in a commercial environment is sought.

Consultant: Carol Proudman/Don Philp.

ANALYST/PROGRAMMERS SURREY

TO £7000

Applicants should be graduates or equivalent, capable of working on mini and microprocessors using ASSEMBLER or Real Time commercial applications. The clients are a Business Systems Manufacturer. Relocation assistance is available.

Consultant: Don Philp.

DOS COBOL PROGRAMMERS KUWAIT

£8500 + +

One of Kuwait's largest and most advanced banking DP users has urgent requirements for additional Programmers with commercial or even banking involvement. Ability to use CICS would be particularly advantageous. Applicants should preferably be single or married with no children. Our clients require qualifications to minimum HND standard. Assistance will be provided for relocation and additional accommodation allowances. London and Midlands interviews will be held during the next two weeks with early decisions. Please complete the attached application form as soon as possible.

Consultant: John Wood.

ANALYSTS/PROGRAMMERS COBOL BIRMINGHAM

TO £5000

Two vacancies currently exist for COBOL Analyst/Programmers to join a large engineering group with a new Honeywell installation. Considerable development projects are in hand including Ledgers, Sales Order Processing, Sales and Purchase Analysis, Payroll, Production and Stock Control, etc. Candidates should have at least 2 years' systems and programming experience in an engineering environment and be capable of taking some project control and development responsibility.

Consultant: Denis Filby.

APPLICATIONS & PACKAGE DEVELOPMENT BIRMINGHAM

TO £5500 +

EMS urgently require experienced Analysts and Programmers to assist with both sophisticated on-line package development and custom-built systems working to agreed time scales. Subsequently, we need experienced staff with a sound commercial or industrial background, able to develop applications systems in Stock Control, Production Control, Sales Order Processing, Accounting Ledger Systems, etc. Equally, we need senior staff capable of assisting with the training of user staff on occasions and project leading custom-built systems. Teams will handle up to four different Turnkey Systems each at any moment in time, ensuring substantial job interest.

Consultant: Dennis Filby.

COBOL PROGRAMMERS LONDON & HOME COUNTIES

£4000-£5500

We currently have hundreds of vacancies on all ranges of hardware for COBOL Programmers in the London and Southern areas. Clients include Banks, Bureaux, Computer Manufacturers, Consultants, Distributors, Engineers, etc. EMS can produce up to 20 interviews for you within five to ten days of original application. Many candidates are in fact offered both interviews and jobs within five days of application. We offer an unrivalled quantity of vacancies elsewhere within the consultancy business. Whatever job you are seeking next, EMS can obtain it for you. We are in weekly touch with all computer installations. EMS get results for you and attractive salary increases. Complete our application form today and let us get a selection of new jobs for you within the next few days.

Consultant: Don Philp/Carol Proudman.

IMS DESIGNERS AND PROGRAMMERS

TO £8000

We currently have large quantities of vacancies throughout London, Home Counties, Midlands and Northern Counties for any staff with previous IMS involvement, either on industrial or commercial installations. Excellent employment opportunities exist with a large data bank of EMS clients throughout the U.K. unrivalled elsewhere. With IMS or DL/1 experience, simply complete the attached application form and let EMS rapidly get interviews arranged and early results for you.

Consultant: Niall Bradley.

ANALYSTS & PROGRAMMERS SURREY

NEGOTIABLE

Preference will be for ICL experience in a commercial or financial environment using COBOL. Our clients are a Life Assurance Group operating in the North Surrey area. Candidates should preferably have a minimum of 2 years' systems or programming experience. Consultant: Salina Mills.

ANALYSTS/PROGRAMMERS STOKE ON TRENT

c £5000

Analysts will be capable of providing systems investigations, recommendations and specifications in concise report format and standards. Equally, although functioning as an Analyst, you should be capable of assisting with programming - RPG or FORTRAN. Applicants should be equally capable of functioning in a Business Analyst role.

Programmers should be experienced in a Production Systems environment, be a tidy and accurate worker and accept occasional odd working hours to cope with varying priorities. Interesting and absorbing employment is available for all candidates.

Consultant: Don Philp.

APPLICATIONS SUPPORT BERKS & STAFFS

TO £8000

Two categories of staff are required: one capable of team leadership in Applications Software controlling up to 10 Senior diagnosticians and a second category of larger volumes of systems software development staff concerned with architecture, particularly in the compiler field. Numerous vacancies exist in this particular area, again offering attractive rewards to suitably experienced personnel. Working knowledge in the following areas is required: COBOL, FORTRAN, ALGOL, IMS and Applications Packages. We urgently need manufacturing support staff at both the Berkshire and North Staffs locations.

Consultant: Don Walklate/Anne Lennell.

CONSULTING PROJECT MANAGERS VARIOUS U.K.

TO £8000 P.A.

We are seeking experienced senior consultants with a minimum of 1 year's DP experience capable of taking control of site project teams throughout the U.K. All applicants must have acquired some degree of managerial control during the last two years and be capable of directing, guiding and motivating up to 50 consulting support staff. A sound knowledge of business information systems will be required, including areas such as Database, TP, Networking, Point of Sale/Data Capture and MIS.

Mobility will be an important factor, as will the ability to work often long, rigorous hours with a minimum of head office involvement. Primarily, the task will be to co-ordinate, schedule, monitor and control client contracts to optimise customer satisfaction whilst at the same time accepting a working systems consultancy role with personal project responsibility. Education to Graduate level is essential. Each candidate will be judged on merit and communication ability. Apply in the first instance, with the attached application form to Dennis Filby, Resources Manager.

HONEYWELL TDS/IDS COBOL U.K.

TO £7000 +

EMS urgently require large additional quantities of staff to assist major consulting contracts throughout the United Kingdom, working with bureaux, distributors, engineers, freight groups, councils and Government agencies. A wide range of vacancies are available within EMS for client support. Equally, opportunities exist for any experienced Honeywell staff interested in working on software projects incorporating client systems, new packages, off-site custom-built systems at our new national data centres and post-marketing support. EMS offer the best career prospects of Honeywell experienced staff throughout the United Kingdom and have sophisticated training centres for staff training. For a top career move, complete the attached profile form today so that early interviews can be arranged.

Contact: Denis Filby.

KUWAIT ANALYSTS & PROGRAMMERS COBOL/ASSEMBLER

TO £13000 p.a. + ACCOM.

We now have a large number of new vacancies throughout Kuwait with clients including Banks, Oil Companies, Car Distributors, Consultancies, Bureaux. EMS have just completed a further business tour of the country, visiting every installation to ascertain new requirements. Developments include MIS, IMS, On-line systems and general applications in distributors and stock-holders. Hardware tends primarily to be IBM and NCR with a rapid development into the NCR base during the last 12 months. All candidates considering the Middle East should contact us immediately for discussions and forward the attached application form without delay. Interviews will be held during the coming week.

HONEYWELL ANALYSTS & PROGRAMMERS NUMEROUS U.K.

TO £7000

The EMS group have over 120 vacancies throughout the U.K. for experienced Honeywell staff to assist with both applications development for new or upgrading installations and to work on package development for the Level 6. A wide variety of installations are available incorporating Engineers, Bureaux, Distributors, Chain Stores, Textile Groups and Local Authorities. EMS offer consulting benefits including attractive travelling allowances, varied career interest and excellent opportunities for early security. Equally, EMS are currently at the forefront of the Level 6 Turnkey Systems field with a large futuristically designed Birmingham Data Centre and new centres planned for Leeds and London. We view these vacancies as the most attractive employment opportunities for current experienced Honeywell staff.

Consultant: Denis Filby.

0782 623665

SENIOR SYSTEMS ANALYSTS

STAFFORD c £5500

Professionals will be for Analysts with previous IBM experience and preferably a sound working knowledge of Partition Scheme, although any other financial background would be equally acceptable. Candidates should be capable of integrating new legislative requirements and designing programming systems to professional standard. Some travelling will be involved to other group sites within the Birmingham region. Consultant: Don Philp

SYSTEMS DESIGNER

NEWCASTLE-UPON-TYNE £3750-£5000

A large processing organisation have additional requirements for candidates with a general commercial background, preferably in areas such as Accounting and Sales. Candidates should have a minimum 12 months' experience of developing new product ranges. The installation is based on IBM equipment. Some relocation assistance will be provided where appropriate. Consultant: Don Philp

SYSTEMS CO-ORDINATOR

LONDON £7000-£8000

All candidates should have sound experience in design and development through to final installation of general batch systems. A good working knowledge of data base in addition would certainly be an asset. Equally, candidates should be interested in experience or at least sound knowledge of real time techniques. Applicants should be capable of co-ordinating team work in a multi project development role. The Group is a major international industrial concern with adequate scope for future development. Consultant: Don Philp

ANALYSTS & PROGRAMMERS

LEEDS & NEWCASTLE-UPON-TYNE c £6000+

A major computer manufacturer has a wide range of additional vacancies for candidates with real experience to support installations throughout the whole of the Northern region. All applicants should preferably have at least one year's COBOL experience. Any experience of working in a total environment would certainly be advantageous although not essential. The career opportunities would be extensive and the application form today and interviews will be arranged where appropriate within the next 3-4 days. Consultant: Denis Filby

2 ANALYST/PROGRAMMERS-COBOL

BUCKS. & EUROPE 6-7K plus

An international group using IBM mainframes are providing a group advisory and support service to European subsidiaries in France, Italy and the U.K. Our clients require staff with at least 2 years' systems experience with some COBOL programming background. The jobs require a fair amount of travel to various European and U.S. locations with all costs re-imbursement by the corporation. Complete the application form today and interviews will be arranged where appropriate within the next 3-4 days. Consultant: Don Philp

COBOL ANALYST/PROGRAMMER

BIRMINGHAM c £5000

Our clients, a large engineering group with a Honeywell Level 82 machine, need a Senior Analyst/Programmer able to work with a Consulting Team taking a leading role in both developing new systems and enhancing current systems. A wide range of projects will be available. Candidates must be people able to work without supervision and capable of working to a professional standard. Consultant: Denis Filby

COBOL PROGRAMMER

WATFORD c £5500

Senior Programmers are required by a large Southern Bureau to work in both a development and maintenance capacity. All candidates must have sound COBOL experience and ideally have some FILETAB knowledge. A wide variety of project development work is involved, including work on packages, pre- and post-processor support and individual applications development for specific bureau clients. Consultant: Don Philp

ANALYST/PROGRAMMERS

LONDON, WC1 c £5000

A major UK software consultancy has a number of additional vacancies for candidates with a minimum 12 months' experience preferably IBM system 3 using RPGII. Applications experience should include areas such as invoicing, Ledger Systems, Order Processing and coding, debugging, writing to modular programming specifications. Excellent career opportunities exist for early development towards Senior Project Leader capacity. Consultant: Don Philp

SOFTWARE ENGINEERS/PROGRAMMERS

WEST SUSSEX £4500+

Applicants must have a minimum 12 months' scientific programming experience incorporating either FORTRAN/ALGOL or ASSEMBLER. Preference will be given to those with real-time experience on any range of machines. All successful employees will work on engineering simulation projects and will take of some of the company's sound career opportunities available for the successful candidates. Consultant: Don Walklate

PROJECT LEADER

TYNE & WEAR TO £5500

Our client is a major industrial manufacturing company. They require Senior Level candidates to work on an IBM System 3 ideally with a programming background. You should have in-depth systems experience within a manufacturing environment. Any previous involvement in on-line materials planning would be advantageous. Please complete the application form today for early interviews. Consultant: Don Philp

SCIENTIFIC AND TECHNICAL

PROGRAMMERS SURREY TO £5500

A major engineering group has a wide range of outstanding vacancies at present and urgently need Programmers with experience of any of the following languages: FORTRAN, ALGOL, COBOL, OR ASSEMBLER. A wide variety of development projects are currently involved and early interviews will be given to all candidates with relevant experience applying for these vacancies. Consultant: Don Walklate

SENIOR SYSTEMS ANALYST

NORTH WEST COAST TO £5250

Duties will incorporate enhancement of existing systems, development of new systems in an on-line accounting and stock control system direct to a large quantity of retail outlet stores. The successful candidate will work in a small team environment and ideally will be someone with stock control or distribution experience. All candidates must have a programming background with preferably some COBOL knowledge. Consultant: Don Walklate

OPERATIONS MANAGER

NORTH WEST COAST TO £6000 PLUS RELOCATION

Our clients urgently require a qualified Operations Manager capable of looking after Software maintenance and software implementation. He will organise shifts and training. Candidates should have good commercial 1900 environment experience with G3 preferably teleprocessing plus communications. All applicants must have a minimum 2 years in a Shift Leader or one year's appropriate experience as an Operations Manager. Relocation assistance will be given where appropriate. Consultant: Don Walklate

ANALYST/PROGRAMMER

WIRRAL TO £5000

A large industrial group has a number of additional vacancies for candidates ideally with TDP experience but they will accept alternatively ASSEMBLER or even COBOL experience on some. Candidates who work in a small team Control Systems with 2-3 years' experience via insurance will be successful for appropriate vacancies. Good relocation assistance will be provided where appropriate. Consultant: Solina Mills

SYSTEMS ANALYSTS

PORTSMOUTH £5250

Our clients, a large insurance group, are looking for a number of additional Systems Analysts with sound commercial experience and at least three years' systems analysis with preferably additional programming experience using COBOL at some point in their career. Ideally, candidates will have some kind of financial or insurance experience. Preference will be for candidates aged c 25 mortgage facilities or relocation costs and a non-contributory Pension Fund. Flex-time is also available. Please apply urgently for an early interview. Consultant: Solina Mills

SYSTEMS ANALYSTS & PROJECT MANAGERS

NORTH WEST TO £6500

A large retail and distribution organisation have a current outstanding for approximately 20 further staff due to substantial commitments to further development projects. A wide variety of project development work is currently in hand with the likelihood of further development commitments continuing for the next 3-5 years. We are seeking candidates with a minimum 2 years' commercial experience either residential in the North West or willing to relocate to the North West. Excellent career opportunities exist. Consultant: Denis Filby or Damien Handlip

ANALYSTS, PROGRAMMERS

BIRMINGHAM c £5000 + CAR

A major manufacturer is currently looking for experienced Analysts with good COBOL programming knowledge. We envisage candidates assisting with the implementation of new computer based systems in with pre- and post-sales activities on behalf of this leading manufacturer. Excellent career opportunities exist for relatively experienced personnel. Consultant: John Wood



EMS CONSULTANTS LTD
61 LOWER STREET
NEWCASTLE UNDER LYME
STAFFORDSHIRE, ST5 2RS
Tulox: 36636

Management Services & Computing Division
Telephone: 0782 623665/6/7/8
Employment Agency to Employment
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COMPUTER WEEKLY, June 8, 1978

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Company Ref. No.

SURNAME Other Names		Telephone	
Address		Home	
Post Code		Bus	
Age	Date of Birth	Place of Birth	Nationality
Married	Children	Car Owners	Height
Position Required		Weight	
Present Position		Nature of any Serious Illness	
Required Salary Range		Salary	
WHILE DO YOU WISH TO WORK			
Within U.K.	Yes/No	Abroad	Yes/No
Will you move	Yes/No	Europe	Yes/No
NUMBER OF YEARS EXPERIENCE		Middle East	
Operating	Programming	Systems Design	Systems Analysis
Available for Interviews		Management	
Available for Employment		Total	
DETAILS OF SECONDARY AND FURTHER EDUCATION			
Schools	Date	Examinations Passed	
College/University	Date	Examinations Passed	
Business Courses with Dates			

Reason for Seeking Change			
Details of type of position wanted			
Additional Information - Please explain below, in an 8-10 line space, your current duties and applications experience			
FOREIGN LANGUAGES			
Spoken	Written	Read	
Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.			
HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
IBM 360/370	DOS	COBOL	FILETAB
ICL 1900	OS	FORTRAN	DRIVER
ICL 2980/2970	MVT/MFT	ASSEMBLER	CICS
ICL 2903	GEORGE 1	PLAN	IMS
UNIVAC 1100	GEORGE 2	PL1	BOMP
UNIVAC other	GEORGE 3	RPG 2	D BOMP
BURROUGHS 700/800	MCP	USERCODE	PERT
BURROUGHS other	Exac 8	AUTOCODE	V SAM
HONEYWELL 66	GCOS	EASYCODER	IDS/TDS
HONEYWELL 6000	OS 2000/200	ALGOL	MICROFILMING
HONEYWELL other	VMEB/VMEK	NEAT	TELEPROCESSING
NCR	J Level	CORAL	DMS
ICL System 4		DL1	
PDP			

1. Present Employer		Town	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE		LANGUAGES	
OPERATING SYSTEM		SOFTWARE	
On-Line R.J.E.			
Real Time Tele Processing			
Time Sharing Data Base			
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	
Projects Completed		Responsibilities	

3. Past Employer		Town	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE		LANGUAGES	
OPERATING SYSTEM		SOFTWARE	
On-Line R.J.E.			
Real Time Tele Processing			
Time Sharing Data Base			
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	
Projects Completed		Responsibilities	

EIMS Group Requirements

Systems Support

6K to 10K Packages!

Phone 0782 623665, Don Philp

Programming Requirements

4K to 8K Packages!

Phone 021-454 7906, Damien Handlip

Freelance vacancies - many more each week

London - Cobol Progs., IBM, ICL, Honeywell, c£200 p.w. IDS, TDS Designers, c£225 p.w.

Midlands - ICL, Honeywell, IBM, Cobol, c£175 p.w.

Northern - IBM, Honeywell Progs., c£200 p.w.

Register for an immediate selection of new business opportunities. EMS have up to 40 vacancies outstanding throughout London, the Midlands, and North

Minis - Assembler, Cobol, Basic Plus - Birmingham Data Centre.
Honeywell Cobol - Birmingham Data Centre.
Industrial & Commercial Cobol Programmer - Birmingham Data Centre.
IDS & TDS Cobol Programmers - Numerous North West - Very Urgent.
IDS Cobol - Surrey.
ICL 1900 and New Range - UK.
IBM, OS/DOS Cobol, Assembler.

EIMS is where the careers are!

JOIN A 2950 IN REDDITCH

Our business is heavily dependent upon our ICL 1903A installed in 1971. We will replace it this year with a larger ICL 2950 system to support our planned expansion into the 1980s to include:

- * Merchandise control through 600 POS terminals
- * Management information systems using on-line facilities
- * We need to invest in people and we welcome your experience

SYSTEMS * PROGRAMMING * OPERATIONS

SYSTEMS ANALYSTS up to £6000

Ideally you should have at least 2 years' Systems experience, but we will also consider less experienced candidates, knowledge of retailing would be useful. Salary will depend on your experience.

TRAINEE SYSTEMS ANALYSTS Salary negotiable

We would also like to hear from candidates with a programming background and the ability to move into systems.

Analysts & Trainees. Contact Tony Russell or John Shakespeare (Extension 140).

PROGRAMMERS & SENIOR PROGRAMMERS up to £5500

At least 18 months' COBOL experience is needed. If you have more (at least 3 years) and the ability to supervise a small team, you will be interested in the senior job. Salaries again depend on experience. Contact Barrie Walker (extension 77).

OPERATORS up to £4500

Again, 18 months' experience, including job set-up and file control. Applicants must be prepared to work shifts. Contact Malcolm Rebeiro (extension 115).

WHO ARE WE? WHERE ARE WE?

We are Europe's leading retailer in the Auto, Cycle and Leisure markets. The jobs are at our Head Office in Redditch, in rural Worcestershire, Birmingham and the West Midlands are all within easy reach.

WE OFFER!

- * Progressive salary scales
- * Staff discount scheme
- * Pleasant working conditions
- * Subsidised restaurant
- * Relocation assistance, or help in obtaining quality local authority housing in appropriate cases

Contact person named on Redditch (0527) 2780 or write to him at Halfords Ltd., Icknield Street Drive, Washford Wets, Redditch, Worcs B98 0DE.

HALFORDS

A BURMAH GROUP COMPANY

COBOL PROGRAMMING INSTRUCTOR

£5,000+. Sound Knowledge of Cobol is essential.

Why not put your experience to good use teaching others? Previous experience in teaching is desirable. Make an appointment to come and see us by phoning.

John Cooke on 01 491 4706

Knight is right for contract staff

Knight 01-491 4706

Staff Services Division of BOC Deutsche Credit Ltd.
Member of Computing Society Association

PROJECT LEADER £12,000-£18,000 ANALYST/ PROGRAMMERS £9,000-£12,500 Holland

As part of the European Data Processing operation, Mars operate a data processing bureau and systems consultancy from Veghel, Holland, to provide services to Mars selling and manufacturing companies in Belgium, Holland, France and Germany. The central installation is IBM mainframe based, and supports distributed conversational processing systems using IBM 3790's in these countries. Systems development, in the manufacturing areas, utilises DEC 11/70, PDP 11/34 and PDP 11/04 computers. Mars Veghel, itself, is close to the Belgian and German border, and one hour's drive from Amsterdam.

In order to meet the increased demand for our services we are seeking to expand our established international team by the recruitment of a further project leader and analyst programmers.

PROJECT LEADER

Your duties will include:

- * the analysis and design of new systems.
- * development, documentation, testing, and implementation of these new systems.
- * functional supervision of analyst/programmers and programs during projects.
- * responsibility for a number of operational systems.

ANALYST/PROGRAMMERS

Your duties will include:

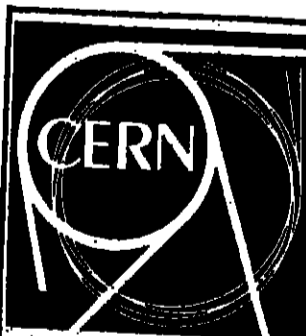
- * detail analysis, programming, testing, implementation and documentation of new systems.
- * enhancement and maintenance of a number of existing systems.

For both positions, applicants, aged up to 35, should have relevant experience in the area indicated, including the use of COBOL and/or FORTRAN.

Working conditions are excellent. A non-contributory pension and sickness assurance scheme are offered as well as generous relocation expenses, including a disturbance allowance.

Interviews will be held initially in London, and applicants should reply giving brief details of career to date to: Nigel Hartley at Austin Knight, 66a High Street, Egham who are assisting us in this recruitment.

Mars



European Organization for Nuclear Research
Organisation Européenne
pour la Recherche Nucléaire

At CERN, the controls of a large particle accelerator complex are being overhauled. This involves installation of 16-20 mini-computers and a systematic application of micro-computers for the process interface. Special attention is being given to systematic diagnostic in hardware and software. The team working on these aspects is looking for a young

SYSTEMS ENGINEER

His education: University degree in Electronics, computer science or equivalent. Experience: Several years in engineering of software and hardware; where the software experience should be related to the design or improvement of real-time systems, and the hardware experience to reliability and diagnostic of mini- and micro-computers and their systems. Good knowledge of English or French. Assignment: To develop the framework for, and to install diagnostic software on a large, modular process interface. To set up and exploit programming environments for micro-computers as well as to participate in their introduction and implementation. Please write for an application form to the address below, quoting the reference: PS-CCI-69.

Head of Personnel, CERN, 1211 Geneva 23, Switzerland

Computer Live-Ware Where are you?

As Europe's foremost systems company, EASAMS is especially interested in locating people who have graduated during the last few years and have used their subsequent industrial experience to gain a greater understanding of the specification, design, implementation and testing of computer software.

Particular areas of interest include:

- 1) Real-time programming of mini-computers in Assembler language for Avionics applications.
- 2) Management Information Systems programming in PL1 on IBM mainframes.
- 3) Mathematical modelling and simulation using Fortran.
- 4) Investigation of methods and procedures to assure the quality of software.
- 5) Operating systems for in-house facilities; serving as an interface between the facilities and users.

We have many vacancies in these and other related areas.

If you have any worries about moving, we will consider help with relocation expenses.

Interested? Then get in touch immediately with Anne Wilt on Camberley 63377 Ext. 54 or write to her at Easams Ltd, Lyon Way, Frimley Road, Camberley, Surrey, quoting reference CW35

EASAMS

A GEC-Marconi Electronics Company



Software salesmen + Technical support staff

Due to our continued expansion in the fastest growing area in DP, we need a further SOFTWARE SALESMAN to cover the south of England.

The successful applicant will know the IBM 360/370 market place, and will have initiative in an area that will provide good rewards.

In addition UCC is looking for TECHNICAL SUPPORT staff to support our customers and marketing staff in maintaining some of the world's leading operating software products. These include UCC ONE (Tape Management Software) and UCC TWO (DOS under OS), which have consistently been voted into the Datapro Roll of Honour. Experience required from our technical staff is a good knowledge of Assembler and preferably experience as a systems programmer.

Those vacancies are based in the Norbury office, and if you are interested please write to David McBrean.

UCC UNIVERSITY COMPUTING COMPANY Software Products International

University Computing Company (Great Britain) Limited
1258 London Road, Norbury London SW16 4XN. Tel: 01-878 1766.

COMPUTER PROGRAMMERS £4,500-£5,500

required with Commercial Systems, ASSEMBLER COBOL experience. To join small enthusiastic comp. manufacturing company.

Contact Brian Bonfield
Henri Hampstead
0442 85285

or apply in writing to:
SERODATA LTD.
44 Stephans Chambers
Bank Court

Wentworth, Hemel Hempstead, Herts.

LANCHESTER POLYTECHNIC

Faculty of Applied Science
Department of Computer Science

Lecturer II in Computer Science

The successful applicant will be expected to contribute fully to the work of the Department in all aspects of research, teaching and for previous teaching experience in Systems and/or in a commercial environment. The applicant should have a sound knowledge of commercial applications and programming languages.

Salary: £4,500-£5,500 per annum (plus pension).

For application form and further particulars apply in writing enclosing a letter of interest and address to the Personnel Officer, Lanchester Polytechnic, Priory Street, Lanchester, Stoke-on-Trent, Staffs. ST4 7TA. Closing date: 21st June 1978.



Data Processing Recruitment Consultants

Programmers-Analysts-Consultants Holland

Salary: £9.5 - 15K + Exceptional Benefits

Our clients, pioneers in frontier communications developments have contributed significantly to the accelerated advancements in Mini Computer technology and are internationally recognised as market-leaders in their field. In pursuit of maintaining their forefront leadership our clients seek to identify key personnel to join them in their next development phase.

Real-time specialists with strong Mini Computer backgrounds will make a vital contribution to the attainment of these goals within an environment offering the highest standards of professionalism, job satisfaction and development potential. Successful candidates will ideally demonstrate concentrated expertise with a narrow band-width of specialisation rather than general experience across a broad spectrum. Furthermore they will either be

graduates (Computer Science or related discipline) or will offer exceptional relevant experience in lieu. Consultants, team leaders and senior analysts are likely to be currently engaged in Data Communications or Real-Time mini software development within either a systems and software group or end-user environment implementing sophisticated applications software. Analyst/programmers and programmers will certainly offer extensive Assembler expertise within these areas of specialisation. In addition to above-market salaries our clients will pay full removal expenses for you and your family and provide, where necessary, a resettlement advance. The costs associated with temporary accommodation will be met by the company pending location of permanent housing.

(Ref 12/A)

Analyst Programmer Cairo

Salary: c£15K + Accommodation

Our Client is an Important European Systems and Hardware Specialist group currently undertaking a major computerisation programme in Cairo for a major Banking Institution. The Hardware selected for this project is based on NCR's CRITERION range. The successful candidate is likely to have a sound financial background with relevant NCR experience

and solid COBOL programming expertise. Single status would be advantageous but not essential as married accommodation is available. In addition to a very high salary our Client provides excellent furnished accommodation and after the initial 1 year tour of duty offers an option to transfer to either Scandinavia or Kuwait.

(Ref 12/B)

Micro or Mini Specialists London + Home Counties

Salaries: £5-8K + O'seas travel

Candidates with 18 months or more practical applications or software development/design experience in either a Computer manufacturing or Software Systems House environment are invited to discuss career advancement with our Clients who have headquarters in London and offices in the Home Counties and Europe. Those who have Assembler language experience on Mini or Micro Computers particularly DEC PDP11,

D-G NOVA/ECLIPSE and T1 800/8900 or Micro Processors preferably Intel 8080/85, Z1LOG Z80 or Motorola 6800 will be ideally suited. In addition to above-market starting salaries our Client offers excellent career advancement prospects and the opportunity to travel within Western Europe. We would like to hear from interested applicants as soon as possible with a view to arranging an early interview.

(Ref 12/C)

U.S. Banking Corporation City of London

Salaries: £6.5-8K + Mortgage

A major U.S. Banking Corporation with extensive computer facilities in the City requires additional D.P. personnel up to team leader level for both their Mini and Mainframe divisions. The Mini Division in particular requires COBOL programmers and Project Leaders possibly with a financial background. The Mainframe Division is in need of PL/I programmers with possibly COBOL or BAL as a second language. Whilst the IBM 370 operating system is O.S., our Client may consider competent DOS programmers.

The ability to work as a member of a project team under strict documentation and programming standards is important. Mini programmers will have at least two years' real-time experience using COBOL and may also have experience of ASSEMBLER. In addition to above-market salaries the Bank offers a 2% subsidised mortgage facility and personal loan scheme, private health and a non-contributory pension plan.

(Ref 12/D)

Applications+Systems Programmers Contract-Holland

£375-450 p.w. Minimum 6 months

PL/I PROGRAMMERS with DOS/VS and CICS/VS experience are required immediately for Amsterdam and other main centres throughout Holland. Contract is renewable after 6 months. Client is currently upgrading from 370/146 to 158 and will shortly be converting to O.S. PL/I PROGRAMMERS must also have solid ASSEMBLER background under O.S. and if possible some experience of RPGII however the latter is not essential. Diverse locations and excellent working conditions. SYSTEMS PROGRAMMERS with solid support

experience in OS/VS1. Rates negotiable in the region of £400 p.w. for minimum 6 months. Installation undergoing conversion from DOS/VS to O.S/VS1. Experience of DOS is not a prerequisite but could be useful. SENIOR SYSTEMS PROGRAMMERS with O.S/VS1 experience in addition to exposure to IMSD/B and possibly CICS/VS. This is a very senior position and commands a high price ticket. We can also discuss possible other benefits available.

(Ref 12/E)

Logistix, Freeport 32, London W1E 3YZ
01 491 4636 Telex 28800

(Revenue charged)



Avon House, 366 Oxford Street, London W1N 9HA

Operating Systems Support 1900-2900

£4000-£5000

Slough

Our client, Berlei (UK) Ltd., have their current computer operations based on an ICL 1902T (128K) running under George II+ and adding a 2950 (34m), which will initially run under DME, progressing to VME/K.

To strengthen their operations support, they require someone to take responsibility for a George II+ system, reporting to the senior systems programmer. Initially George II+ will run on both machines, with the opportunity to work on VME/K at a later date.

The successful candidate should have a varied technical background, perhaps as a competent senior operator or a programmer with a strong operations background. A knowledge of George II (or George III) is required in addition to at least 2 years' working on 1900s. Educational background should be at least 'O' level standard.

The continual efficiency of the company's current and future systems will rely heavily on operating systems support, and the appointed candidate will enjoy a challenging position in a company that keep abreast with current technology while offering employment benefits including a subsidised canteen, flexi-time and regular salary reviews.

CONTRACT

Saudi Arabia

£15,000 per month

Tax Free

Our clients require a programmer/engineer for a minimum of three months and probably six.

The job will involve

Writing comprehensive programmes in the structural and civil engineering fields.

Modification of programmes and packages to suit on-site requirements.

Training engineers in the use of the computer.

The applicant should have

AB. Sc., preferably in Civil Engineering

A thorough knowledge of Basic language is preferable

A minimum of three years' experience in DP working on Engineering applications

Familiarity with Hewlett Packard hardware

A salary of £15,000 per month, tax free, will be paid plus return air fare, accommodation and a daily allowance.

Initial interviews will be held in London or Dublin, so please telephone Graeme Rider on 01-459 3212 for an immediate interview.

Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212 Telex 27950
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)



SENIOR SYSTEMS ANALYST

West End

£6000 to £7300

An opportunity has arisen for an experienced and articulate Systems Analyst to progress into a more demanding and responsible position, leading and co-ordinating the work of a team of three other analysts.

The installation comprises an ICL 1903 machine running under GEORGE II, and an extensive Real Time system utilising DRIVER and COMMS MANAGER. Experience in any of these areas would be highly desirable, as would a programming background in either COBOL or PLAN.

You should have at least 4 years total DP experience, 2 years of which should be in Systems Analysis, and during this time you ought to have installed 2 major systems. The work will cover many different projects and will involve a wide area of systems and applications.

Reference JC 23/1

COBOL PROGRAMMERS

City

£4000-£5000 plus Mortgage

A major financial organisation with an expanding ICL 2900 system is seeking several programmers for their city-based installation.

These positions will be ideal for people with at least one year's commercial experience gained preferably on ICL equipment.

The company offers a high starting salary and an excellent benefits package including: Season Ticket Loans, Flextime and a Mortgage Subsidy Scheme.

PL1 PROGRAMMERS

City

Reference JC23/2

£5500 plus mortgage

A major financial organisation needs programmers with 2 years good commercial experience to join their expanding DP department in the City.

They currently operate a twin IBM 370/138 system, running under DOS/VS, and have a comprehensive communications network, so any knowledge of CICS would also be an advantage.

In addition to a competitive starting salary and excellent career prospects, the company offers interest-free Season Ticket Loans, free Life Insurance and an Annual Bonus scheme, and a 3% Mortgage.

Reference JC 23/5

SYSTEMS PROGRAMMER

City

Negotiable

A large and highly respected financial institution is seeking a capable and imaginative OS/VS Systems Programmer to work in their City based installation. They are using two IBM machines - a 370/148 and a 370/168, running under OS/VS1 with VM/CMS. The ideal candidate would have a general programming background preferably in ASSEMBLER or PL1, with a minimum of around 18 months in OS or OS/VS Systems Programming. Knowledge of IBM 370 Hardware and Software fundamentals is desirable as is any experience of performance measurement and estimation techniques. Salary will be totally dependent upon ability and experience, and will not prove a limiting factor for the right person.

FORTRAN PROGRAMMERS

London

Reference JC23/4

£4000-£6500

A major engineering company located just south of the river near London Bridge Station require an experienced Fortran programmer. The suitable applicant should have a degree in Applied Mathematics or Engineering and at least two years experience in Fortran, preferably on IBM equipment.

Liaising with users and other programmers you would gain experience in Scientific Applications, Stressing, Thermo Dynamics etc and could expect good career progression and an above average salary.

COMMUNICATIONS PROGRAMMERS

Hertfordshire & North Kent

Reference PG 23/3

£4000-£8000

A market leader in computer based communications equipment have a number of opportunities for engineers and programmers in the following areas:

Real Time

Software Engineering

Micro Processors

Distributive Processing

Compiler Software

Data Communications

Experience in any of the above, possibly coupled with a degree, would lead to an excellent salary together with a generous benefit package which includes Flextime, 24 days Holiday, L.V.'s, Generous relocation expenses and Subsidised Company products.

Reference PG 23/6

SYSTEM SUPPORT GROUP Group Leaders & Assistants

LONDON SE1

The Computing Branch operates an ICL 1903T computer under GEORGE 3 with a variety of remote terminals. Additional staff are required to maintain software, compilers, packages and utilities for the computer and to give support services to terminal users, including data communications aspects.

Applicants should have had experience with computer operating systems or data communication systems and have had a good education, preferably having obtained A level mathematics and O level English Language qualifications.

Group Leader. Salary within a scale rising from £5956 to £7006 per annum according to experience. Vacancy No. 1224/78/CW

Assistant. Salary within a scale rising from £4580 to £5590 per annum according to experience. Vacancy No. 1214/78/CW

The Salaries quoted are inclusive of London Allowance and a Self Financing Productivity Payment.

Applications giving full details should be forwarded to the Personnel Officer (Recruitment), Central Electricity Generating Board, Bankside House, Summer Street, London SE1 to arrive by 22 June 1978.

South Eastern Region



OPERATORS

EIGHT IBM OS JUNIOR AND

SENIOR OPS

£3800-£6000

London and Home Counties.

THREE ICL 2904 OPS

£3400-£4500

London.

THREE PDP 11 SERIES OPS

£3300-£4500

London

FOUR IBM DOS JUNIOR AND

SENIOR OPS

£3200-£4800

London and Home Counties.

THE ABOVE JOBS CARRY A WIDE RANGE OF BENEFITS- FROM CHEAP MORTGAGES TO FREE LUNCHES! FOR THESE, AND ANY OTHER COMPUTER JOB, RING MIKE OAKES TODAY!

staffscene

COMPUTER RECRUITMENT 01-353 6931

9 ST. BRIDE ST., LONDON EC4

UNIVERSITY COLLEGE LONDON

Department of Physics and Astronomy

JUNIOR PROGRAMMER

Required to join a small team providing

technical support to an elementary

particle research group. We require a

person with a degree in physics or

computer science and a minimum of

two years experience in programming

in FORTRAN. A degree in physics or

computer science would be an advantage.

The successful candidate will be

responsible for the day to day

operation of the computer system

and will be expected to maintain

the system in good working order.

Applications should be sent to the

Personnel Officer, Department of

Physics and Astronomy, University

College, Gower Street, London WC1E 6BT.

GREATER LONDON HEALTH BOARD

COMPUTER APPLICATIONS UNIT

INTERMEDIATE

SYSTEMS DESIGNER

Salary Grade: £4000-£5000 plus increase

providing

Applications are invited for the post of

Intermediate Systems Designer in the

Computer Applications Unit of the

Greater London Health Board. The

successful candidate will be responsible

for the design and development of

computer systems to meet the needs

of the Board. The post is a full time

position and the successful candidate

will be expected to maintain a high

level of performance. Applications

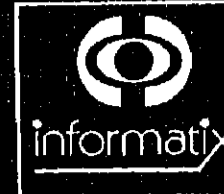
should be sent to the Personnel

Officer, Greater London Health Board,

25 Abchurch Lane, London EC4N 3DF.

Informatix UK & O'seas Index Phone 01-831 6055

Informatix 24 Gray's Inn Road London WC1X 8HR Telex 299539 HAVEN G



POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Permanent/Contract Programmers	c £6,000	Software House	London & South	IBM OS	Urgently required experienced COBOL programmers for a variety of commercial applications.	1/23
Assembler Programmers	to £6,500	Manufacturer	Herts	Minis	Openings for ASSEMBLER programmers with 2 years' experience to develop software products.	2/23
Graphics/Communications Staff	c 50,000 guilders	Service Industry	Holland	Any Minis	Graphics and communications experts required to work on varied assignments in a dynamic environment.	3/23
PL/1 Programmers	to £5,500+	Services	N and Central London	IBM OS	Excellent opportunities for experienced PL/1 programmers to develop systems in a stimulating environment.	4/23
Systems Analysts	to £6,000 + LV, etc.	Food Industry	N. Surrey	IBM OS	Opportunities for analysts with 1 year's + experience and a programming background to join a progressive organisation.	5/23
Fortran Programmers	c £5,000	Engineering	W. London	Minis	FORTRAN programmers with a minimum 1 year's experience required to develop/assist with engineering and associated projects.	6/23
Analyst/Analyst Programmers	to £6,500	Bureau	N. London	IBM OS	People with analysts/team leadership experience required to work on interesting applications.	7/23
Programmers	£5,500 + mort.	Insurance	EC2	ICL 1900	1900 COBOL programmers with minimum 18 months' experience required to join this expanding DP department to work on on-line systems.	8/23
Permanent/Contract Programmers	to £7,000	Software House Bureau	City	Burroughs	Our client urgently requires staff with experience of Burroughs medium range equipment to work on interesting commercial applications.	9/23
Systems Analysts	c £6,500+	Manufacturer	Middx. Europe	Minis	First-class opportunities for analysts with O/L warehousing/inventory control to develop/design systems and implement throughout Europe.	10/23
Programmers	to £6,000	Retail Trade	London	IBM	Programmers with 1+ years' COBOL or ASSEMBLER experience required to develop interesting systems using on-line/TP techniques.	11/23
Programmers	to £6,500	Commercial Services	Sussex based	DB/PDP etc.	Programmers with ASSEMBLER/COBOL experience required to develop commercial systems for a wide range of minis.	12/23
NEAT 3 Programmers	£10,000 + accom.	Software House	Middle East	NCR	Urgent requirement for a 2 years' + NEAT 3 programmer to work on various applications in UK/Middle East.	13/23
Contract Personnel	£180+ pw	Various	London SE England	IBM, ICL, Burroughs, DEC, Honeywell	COBOL, RPG II, Assembler, BASIC + programmers with 2 years' + experience urgently required.	14/23
Systems Programmer	to DM 65,000	Banking	Germany	IBM 370/168	Experience required in T/P, software engineering, operating systems and knowledge of German.	15/23
Project Leader	c £7,000 + mort.	International Bank	EC3 & Overseas	IBM 370 DOS VS	2 years' relevant experience required within financial environment, including project responsibility. Analytical ability and qualities of leadership.	16/23
Consultants, Analysts, Analyst Programmers, Programmers	to £8,000 + overseas allowance	Software House	London & Middle East	Any	Urgently required experienced staff for an expanding UK and overseas software house. Excellent opportunities for ambitious D.P. professionals with a minimum of 2 years' + relevant experience.	17/23

NETHERLANDS

MINI PROGRAMMERS • ANALYSTS & CONSULTANTS

to £15,000

Our clients, market leaders in systems and software development, with regional headquarters in Holland are embarking on a further expansion programme for which they require numerous additional personnel. In particular they wish to recruit Mini Software and Applications Specialists, Analysts and Senior Analysts and Consultants with in-depth experience in any of the following areas:

*Message Switching

*Computer Networks

*Data Communications

*Mini Computer Software

*Process Control

Assembly level programming experience is of primary importance and candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met in full by our clients. Interviews will be held in London as soon as possible and offers will be made to successful applicants no later than end-June.

Ref 18/13

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene 01-439 7871
24 hour answer phone

WITHOUT WAITING —

Charles Barker Confidential Reply Service

Please send full details of your requirements to the address below. We will reply by post to the address below. We will not disclose your details to any third party. We will not disclose your details to any third party. We will not disclose your details to any third party.

Programmers System Designers

South Herts

Our client is an acknowledged leader in the world-wide use of complex high integrity real time systems and has recently established a group to identify and develop micro- and mini-processor products that enhance the performance of the world communications network. The company now has vacancies for programmers and designers to bring three product concepts to fruition in the next 1 to 2 years. These are opportunities to build up expertise in a well supported group working in a fast growing area with exceptional prospects for future career development both in this country and abroad. Immediate requirements are for:

Programmers to £6000

At least 2 years proven track record in a technical development environment, preferably using a high level language and structured programming techniques.

System Designers to £7000

Specific expertise in one of the following areas: Disc based mini computer operating systems. Support software for implementation of complex man-machine protocols. Intelligent VDU terminals. Packet switching protocols.

Reference: 1476

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

PROGRAMMING MANAGEMENT

BRACKNELL

To £6,250

Our Client is seeking an experienced D.P. professional who has the ability to manage, motivate and train staff under their direction.

The installation houses a Honeywell 2030 operating under OS 3000 with Redfin key to disc equipment currently being used for data preparation. Plans to upgrade the hardware and develop on-line applications are well advanced.

Suitable candidates will have a programming background with knowledge of COBOL and Easycode. Ideally applicants will have worked to good standards and will be keen to train and motivate junior staff.

In addition to a competitive salary the Company has a pleasant working environment and good conditions of employment. Assistance with relocation expenses will be available where necessary.

Ref. W1/0806

24-hr. answering service
Please telephone for a confidential
discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981

FREELANCERS

Major Consultancy working through the UK and abroad require

MEN OR WOMEN

ANALYSTS/PROGRAMMERS

with initiative to work on small business and 'scientific' systems, mainly in the South East. Experience with mini-computers and production systems programmed in BASIC would be an advantage.

Please write with an outline of career to date, stating degree of competence in languages and machines used. Please also indicate availability.

BOX 1983, COMPUTER WEEKLY, Dorset House
Stamford Street, London SE1 9LU

UNIVERSITY OF ABERDEEN

DIRECTOR

UNIVERSITY COMPUTING CENTRE

Applications are invited for the post of Director of the University Computing Centre which falls vacant on 1 July 1978. The Centre has a dual processor Honeywell 66/80 System, one of the largest installations in the United Kingdom Universities, with a considerable commitment of data base activity comprising the provision of a user service, the development of related software and data base research projects.

Salary within Range IV, Other Related Staff

Further particulars from The Secretary, The University, Aberdeen, with whom applications (2 copies) should be lodged by 26 June, 1978.

CITY TREASURER'S DEPARTMENT

PROGRAMMER

AP.3/4/5 £3,388-£4,615 p.a. (further pay award pending operative from 1st July, 1978)

The City Council is currently converting from an IBM 380/30 to an ICL 2904 computer. The new machine which is already installed has 4 EDS 60 discs and will shortly have 7602 communications equipment. The successful applicant will join a team responsible for the conversion of existing applications and development of new applications. Applicants should have had several years' experience in the use of COBOL with ICL machines. Commencing salary within the above range depending upon qualifications and experience. Assistance with housing accommodation, payment of removal expenses, lodging and travelling allowances in approved cases. Application forms from the Chief Personnel Officer, Town Hall, Stoke-on-Trent, ST4 1HH or telephone 0782 48241 - Ext. 481. Closing date 15th June, 1978. It is a requirement of the City Council that the person appointed to the above post shall be or become a member of an appropriate, specified trade union. S.W. TITCHENER
Town Clerk and Chief Executive Officer

City of **STOKE** on Trent

HERTS/MIDDLESEX

NOTICE TO SYSTEMS ANALYSTS

Haymarket Computing are D.P. recruitment specialists to 35 companies in the Herts/Middlesex area. Such is the current computer employment market that at any one time almost all of these companies have vacancies for Analysts and/or Programmers. At the present moment, however, our most urgent need is for Analysts on behalf of 12 clients in the following areas -

Cockfosters
Borehamwood
Potters Bar
Waltham Cross
Hemel Hempstead
Hayes

Stanmore
Harrow
Wembley
Southgate
Tottenham
Luton

Salaries range from £4,600 to £7,300 covering all levels of experience from Juniors to Project Leaders.

For more information ring:
HAYMARKET COMPUTING LTD.
Tel. Cuffley (Herts.) 4130
up to 6.30 p.m.



Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth
"In the beginning was the word, and the word was four bytes, and thirty-two were the bits thereof." - IBM Technical Report.

Block 1 (Label Records Are Standard)

HEX has set off with Ascii from Silicon Valley to rescue Cleo from the clutches of Sheriff Sprocket and Wild Bill Bootstrap, as the first stage of his plan to overthrow the System.

Hex and Ascii passed through a narrow crossing between the northern peaks of the Sierra Nueva at about midday, and then began to descend. They reached the hills overlooking Sprocket's Hole early that afternoon. For a while Hex lay on his belly, scouting out the land.

There was very little shelter to be seen. He had hoped that he could creep unobserved right up to the smaller hut and wait in the shadows to accost Cleo as she went about her daily work. But he had forgotten how bare the landscape was. Clearly that approach was out of the question. The next best thing was a night time ambush.

He could observe the movements of Cleo and the two androids from his concealed position in the hills during daylight, then storm in under cover of darkness and seize her before either of her jailers had time to react.

If it came to a fight he felt confident that the advantage of surprise and Ascii's bionic teeth would see them through. He settled down to watch. Now and then he caught sight of a figure moving between the huts. From a distance it was not easy to identify but he thought it looked like Bill Bootstrap. As sunset approached and there was still no sign of Cleo, Hex began to worry. He had only the word of Inspector MacRo that she was to return here. Perhaps MacRo's order had never been carried out? Or perhaps it had been a lie, merely to placate him, and she had been executed? After all, the Night Operators had exterminated a whole city of people - why balk at one more death?

He turned his lenses to full magnification, but the air was too warm and turbulent for a clear view. He dearly wished he could hook up over the Network to a nice fast array-processor and analyse the image in 3D.

Then, just as the sun began to sink behind the mountains, a figure with bare arms, wearing what seemed to be a



white blouse, appeared briefly at the window of the larger hut to draw the curtains. He only caught a momentary glimpse; but it had to be Cleo.

The light was fading. He had to decide whether to go ahead with the attack. He stood up and whistled softly for Ascii, who had wandered off while Hex was busy surveying the valley. There was no answering bark, but shortly afterwards the dim glow of Ascii's eyes at low power became visible. He had caught a rabbit. He opened his mouth and proudly deposited his prize before his master. Hex was thinking that a succulent leg of rabbit, deep roasted by Ascii's lasers, might not go amiss before their exploit when the creature shook itself upright, stood for a moment petrified then bolted into the night. So much for Ascii's razor-sharp fangs!

"Okay, old friend," said Hex, "we're going to get Cleo. Remember: this has to be absolutely silent."

He started to crawl down slowly on hands and knees. Ascii followed obediently, close behind. When they were still about 100 metres from the main cabin he halted. To go any closer would expose them to the light and risk detection. Their only choice was to wait till the lights went out, give the androids time to fall asleep, then pounce. Hex prepared for a long vigil. As the stars wheeled imperceptibly overhead, he grew colder. He rubbed his hands to bring back some life into them.

Then he felt something metallic nudge him in the ribs from behind. "All right," he whispered to Ascii, "don't get impatient. We can't go in until they put out the lights." "You're going in right now," said a gruff voice. Hex turned round. He found himself facing Bill Bootstrap who held an old fashioned shotgun aimed directly at his midriff.

"Tell your hound that if he gives any trouble I'll blow you to bits."

Hex swallowed hard, raised his arms above his head and said to Ascii in as unflinching a manner as he could: "Don't try anything rash, old boy."

He was manhandled roughly to the doorway where a sharp shove in the ribs propelled him staggering into the lamplight. Inside sat Davy Sprocket, a rifle on his lap. Hex blinked. There was no Cleo.

Sheriff Sprocket stood up and trained his firearm on Hex. Ascii entered meekly, followed by Bill Bootstrap who slammed the door.

"Our orders are to keep you here under guard till the arrival of Commander Kludge," stated Sheriff Sprocket. "The first thing you have to do is power down your dog."

"Impossible!" protested Hex, "his memory is volatile." "Either that or we shoot you. We were told to bring you in dead if we couldn't get you alive."

Reluctantly Hex bent over his bemused dog and initiated the emergency power-fail procedure. There was a lump in his throat as Ascii finally whirled to a stop. Now they were really trapped.

"Good," said Sprocket, "we can all sit down now." Hex took a stool next to Ascii's recumbent form, while Sprocket eased himself into a rocking chair across the room, still holding the rifle. Bill Bootstrap propped his gun against the doorpost, and Hex watched as he went outside again. When he returned a few moments later his pipe was in his mouth. He picked up his shotgun and seated himself at their hash table, puffing contentedly.

"Where's Cleo?" asked Hex, breaking the heavy silence. "Good question," replied Sprocket. "You seen her recently Bill?"

"Now let me see," answered the other. "Cleo?" He stared at the ceiling in mock puzzlement. "If I recall rightly she used to work here once."

"That's the one," responded Sprocket, grinning as Bootstrap handed him the pipe.

Hex made no further attempt at conversation.

Can this really be the end for the Kid and Ascii? You'll wish it was when you read next week's breathtaking episode.

© 1978, Richard Forsyth, Rair Timesharing.

How lorry firm found a use for check digits

HOW to maintain and increase speed and reliability of service to its customers in a cost effective manner was the problem that faced Wilkinson Transport at the outset of an expansion programme, five years ago.

The prime marketing objective of any transport company is to improve continually the service levels the company can give by determining what service customers are seeking.

The second marketing objective is to obtain a more even flow of traffic throughout the year.

Deliveries average 36 per day, per vehicle, with approximately four collections; this shows a total of about 13,500/14,000 consignments currently each day; this shows a growth ratio of consignments per day over the last five years of about 150 per cent - which begins to tell up when one considers that seven people are involved in the movement of one consignment.

The number of consignments having to be handled on a daily basis reached a situation where manual control, weighing and pricing became impossible to continue while still maintaining the same service.

With a network of 17 depots covering the country, each serving a separate geographical area, stretching from Glasgow in the north to London in the south, good documentation and experienced staff control are vital elements towards prompt reliable service.

It became increasingly obvious that if the administration were to cope with

extra expansion, a highly sophisticated system would have to be introduced to eliminate risk areas.

It was necessary to co-ordinate all small consignments being delivered all over the country. This of course presented a variety of problems.

Consignment notes were related to a serial number, but there was a definite possibility of that number being misquoted.

And from the traffic office in each area every movement had to be individually recorded and accompanied by the customer's consignment note throughout the entire journey. The answer to the problem was in putting all the information on to a computer.

It was at this stage that they approached the experts in the field of manufactured stationery for check digit numbering. Roffs Print Ltd of Falmouth, Cornwall.

numbers on cheques, or simpler, less sophisticated systems had been used.

To appreciate the system that has recently been put into operation, it is important to fully understand check digits.

A check digit is a number or numbers bearing a mathematical relationship to a serial number - therefore, when a computer recognises that the serial number and the check digit compare, the information must be correct, within the limits of the system being used. Thus a check digit validates the input information in the computer.

Dependent on that system, a check digit will prevent or at the very least minimise the number of errors.

A weighted system means that each number in a serial number is multiplied by the individual weight. The results are added together and the resultant total divided by the modulus.

lar moduli. Modulus 10 produces a single figure check digit 0 to 9. See Figure 1.

Within a computer, check digits are constantly used to validate serial numbers.

The problem arises when source documents are used as an input to the computer, and where serial numbers are used as the means of retrieval it is imperative that the source documents also have associated check digits.

This means that the company's own documentation can be used as source documents, either as machine readable documents, key-punched at a video terminal or as a more conventional punched card, paper tape, or magnetic tape input derived from the source document.

The advantages of using a check digit system are that it validates the input which is the basic requirement of computer usage, and ensures the correct retrieval of information. And so it came about that a system, known as Wilkontrol, was first installed by Wilkinson in June 1977. A mainframe central computer, Univac 90/30, was put into the High Wycombe depot and

this is linked to mini-computers in other depots.

Wilkontrol is a push button control system from collection to delivery. Keying the consignment note with its check digit number and details of the consignment into the central computer, gives 100 per cent monitoring and accurate information is obtained in seconds. A continuous check ensures parcels are routed in the right direction, and daily reports are available for delivery details.

This information eliminates split deliveries and gives proof and traffic enquiries immediately. An added advantage of this system is that consistent pricing is automatically carried out, with fully detailed invoices referring to each consignment, thus providing a speedy cash flow.

The information on the check digit consignment note is fed into the central computer via a video terminal. The computer identifies the delivery address and automatically relates the address to the final depot, identifying the route.

Roffs Print considers that pre-verification of

Delivering the goods on time is the prime object of any haulage firm. Yet if such a firm wants more business, the paperwork can often quickly overwhelm it. Wilkinson Transport faced this problem and GILL TURNER of Turner Pitt and Associates describes how it went about computerising its documentation. But to ensure accuracy it decided to use a check digit system which has virtually eliminated clerical errors.

check digits plays a vital part in its production. The equipment is designed to stop before an error is printed, thus protecting the validity of the information fed into the computer.

A second Wilkontrol system was installed at Higham Ferrers in September 1977, a third at Rochdale in November and a fourth is scheduled for Barking in January, 1978.

Serial Number	Weighting	Modulus
878543	731731	10
Unit	3x1	3
	4x3	12
	5x7	35
	6x1	6
	7x3	21
	8x7	56
		133+10

= 133 with a remainder of 3 = 6.D. or 7 = 6.D.

Figure 1

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